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ABSTRACT

Presented is a research bibliography (covering the years 1888 to 1975) which contains annotations of 439 studies and bibliographical citations of 419 additional projects on physical education, recreation, and psychomotor function of mentally retarded persons. In addition to review and analyses of trends and major findings, unanswered questions that need to be proved in further studies, projects, and programs are delineated. Study entries are listed alphabetically and provide information on the author, title, source, date, and pages, annotations which translate research findings into practical instructional hints, teaching techniques, and related ideas that can be used by practitioners. All entries are indexed and cross-indexed in five indexes: condition, level, age, and sex of subjects; physical, psychomotor, cognitive, and affective characteristics of subjects; physical education, recreation, and psychomotor activities; tests, rating scales, evaluative instruments, and assessment devices; and miscellaneous descriptors. (Author/SB)

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ANNOTATED RESEARCH BIBLIOGRAPHY IN PHYSICAL EDUCATION, RECREATION, AND PSYCHOMOTOR FUNCTION OF MENTALLY RETARDED PERSONS

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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1201 Sixteenth Street, N.W. Washington, D.C. 20036

ACKNOWLEDGEMENTS

If you have a penny and I have a penny and
we exchange, we each have one penny;
But if you have an idea and I have an idea
and we exchange, we each have two ideas.

Compilation of abstracts and listings of studies presented in this research bibliography on physical education, recreation, and psychomotor function of mentally retarded persons is the result of cooperative efforts of many different people representing a variety of organizations, agencies, and institutions. Particularly outstanding have been contributions of individuals who submitted copies or abstracts of their research studies, college/university personnel--professors and students who reviewed and abstracted materials, and people in the field who provided guidance and direction in the development of this volume.

Special thanks and appreciation for their vital roles in the total process are extended to *Lowell Klappholz*, Physical Education Newsletter, who edited the manuscript in addition to contributing abstracts; *Gail Balmer*, IRUC staff member who typed the final manuscript; and *Wanda Burnette*, Administrative/Program Coordinator, who coordinated efforts and activities of many people throughout the entire project. This publication truly exemplifies the importance of teamwork and cooperative action to achieve mutually desirable goals. To all who contributed to the success of this venture, thanks and well done!

JULIAN U. STEIN
Director

PREFACE

Hats off to the past;
Coats off to the future.

This research bibliography on physical education, recreation, and psychomotor function of mentally retarded persons has developed over several years and through a series of planned steps. Although this volume is comprehensive, it is not exhaustive as studies have been received and reported at an extremely fast pace. Table I below shows that of 817 dated studies reported in this volume, 569 (69.6 percent) were completed in the last ten years and 654 (80.1 percent) since 1960; only 153 (18.9 percent) were done prior to 1960. Further investigation shows that 279 studies (34.1 percent) were reported in the five year period between 1968 and 1971 when research interest apparently was at a peak for this subject area. Although data for 1974 and 1975 must be considered incomplete, reported studies for 1972 and 1973 were lower than any year since 1965.

TABLE I: Years in Which Studies Were Reported

Year	Number of Dated Studies		
	Abstracts	Addendum	Total
1975	0	10	10
1974	1	31	32
1973	17	35	52
1972	25	16	41
1971	31	38	69
1970	29	36	65
1969	27	40	67
1968	49	34	83
1967	27	28	55
1966	37	24	61
1965	22	22	44
1964	15	13	28
1963	10	3	13
1962	5	7	12
1961	10	4	14
1960	14	4	18
1950-59	70	33	103
1940-49	18	9	27
1930-39	6	6	12
1920-29	2	1	3
1910-19	2	3	5
1900-09	0	1	1
1890-99	0	0	0
1880-89	0	2	2
Total	417	400	817

This trend in the late sixties and early seventies was probably influenced by:

- publicity and information which provided stimulus for research in these areas;
- graduate professional preparation programs with research requirements which increased dramatically in special education, physical education, recreation, and related areas;
- questions raised by personnel in the field about various aspects of programs and activities in these areas;
- emphasis upon credibility of and accountability for programs and activities in these areas;
- interest in perceptual-motor programs and activities in infant/child growth and development in general and in cognitive development and academic performance of mentally retarded persons in particular; and,
- efforts and support of federal agencies such as the Bureau of Education for the Handicapped and private groups such as The Joseph P. Kennedy Jr. Foundation.

As research and program information became more readily available through information systems, materials centers, and resource networks, previous studies were better identified so that less duplication resulted. With increasing emphasis and concern on mainstreaming, integration, least restrictive environments, zero reject principles, right to education, right to treatment, right to community services, consumer advocacy, and community living, changes of quantity, types, and focus of research in physical education, recreation, and psychomotor function of mentally retarded persons can be expected. Only in this way can this area remain viable and continue to contribute. However, use of this publication is a logical first step in gathering, reviewing, and applying research information and results about physical education, recreation, and psychomotor function of mentally retarded persons.

Since the early part of this century, but particularly during the last ten years, physical educators, recreation personnel, special educators, psychologists, parents, community leaders, students, and others vitally concerned with the welfare of mentally retarded boys, girls, men and women, have inquired about values and contributions of physical education, recreation, and related motor activities for retarded persons; many have sought research evidence and verification for these same programs and activities. While many individual research studies have been published in the form of masters theses, doctoral dissertations, and special project reports, included in abstracts of research proceedings at AAHPER National and District Conventions, found in selected journals, periodicals, and newsletters, reported at various special conferences and meetings, and obtained from different information systems and resource centers, this volume represents the most comprehensive effort yet made to present studies and analyses in these areas of concern. In addition to studies involving mentally retarded subjects, annotations and listings are included for surveys of physical education, recreation and related programs for this population, and conditions under which these programs have been conducted in schools, recreation centers, camps, residential settings, hospitals, activity centers, and other facilities.

This major step in reporting several hundred individual studies in physical education, recreation, and psychomotor activities for retarded persons should offer practitioners much help in dealing with problems that exist at the local level. In fact, many of these annotations and content of analysis that follow have been approached in terms of application for and use in ongoing programs and activities. Many ideas and points presented in this publication are practical, functional, and applicable to physical education, recreation, and related programs for mentally retarded persons especially when they are coupled with experience, knowledge of children in general, understanding of those specifically being served, and tempered with good judgement. After all, the real value of research is in putting findings and results to work to improve programs, activities, and services for people at grassroots levels. For reseachers, this volume should raise as many questions and challenges as answers. This is as it should be for good research is a never ending process in which new vistas, uncharted waters, and unfamiliar horizons emanate. From questions and problems come directions and hints, if not answers and solutions, which form bases for progress, improved programs, increased opportunities, and enriched lives.

You can help continue this ongoing and never ending process of collecting, analyzing, reviewing, and reporting research about physical education, recreation, psychomotor function of mentally retarded persons; individuals who have conducted or are aware of any type of research study--experimental, field, basic, applied, descriptive, survey--are encouraged to send data to *Information and Research Utilization Center in Physical Education and Recreation for the Handicapped (IRUC), AAHPER, 1201 16th St., N.W., Washington, D. C. 20036.* Send information about titles and authors along with abstracts and studies themselves of research completed, in progress, or contemplated not included in this volume. With this type of continuous input, information and materials can be kept current, new findings introduced, decisions made regarding supplements to this volume, other dissemination procedures explored, greater coordination of research needs provided, and quicker and more effective use of research findings accomplished. Your help is sought, needed, and vital in the continuing crusade to enrich, upgrade, and increase physical education, recreation, and psychomotor activities and opportunities for all mentally retarded persons.

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INTRODUCTION

The problem with research is that we use it the way a drunk uses a lamppost--for support rather than illumination.

This research bibliography has developed through several stages and phases over a ten year period. Initially, bibliographical data about research studies in physical education, recreation, and psychomotor function of mentally retarded persons were presented in a 1966 publication[1] made available by the AAHPER Project on Recreation and Fitness for the Mentally Retarded. Prior to this time, critical analysis of research in motor function and physical fitness of the mentally retarded appeared in Rehabilitation Literature.[2] A review of research findings and needs regarding psychomotor function of the retarded was published in the Journal of Health, Physical Education, Recreation[3], a special section dealing with physical performances of the mentally retarded was presented at the 1966 Scientific Symposium on Mental Retardation sponsored by The Joseph P. Kennedy Jr. Foundation[4], and a special interest section was included in a 1966 National Conference on Programing for the Mentally Retarded sponsored by AAHPER in cooperation with 22 other national agencies.[5]

Comprehensive reviews and analyses of psychomotor function, physical education, recreation, and related areas for mentally retarded persons have also been reported in the literature at various other times; some information systems, materials centers, and resource networks provide services by which such materials can be obtained at reasonable costs. Critical reviews, analyses, articles, and resources interested readers can obtain include:

. "Motor Skills in Mental Deficiency." L.F. Malpass. Handbook of Mental Deficiency. (N.R. Ellis, ed.). New York: McGraw Hill, 1963.

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[1] Bibliography on Research in Psychomotor Function, Physical Education, and Recreation for the Mentally Retarded. Washington, D.C.: American Association for Health, Physical Education, and Recreation, 1966. Available from Information Center on Handicapped and Gifted (1920 Association Drive, Reston, Virginia 22091) document number ECO 10463, or from ERIC Reproduction Service (EDRS, P.O. Box 190, Arlington, Virginia 22210) document number ED015583.

[2] Stein, Julian U. "Motor Function and Physical Fitness of the Mentally Retarded." Rehabilitation Literature 24:8: 230-242,263, August 1963.

[3] Stein, Julian U. and Roy Pangle. "What Research Says About Psychomotor Function of the Retarded." Journal of Health, Physical Education, Recreation 37:4: 36; April 1966.

[4] "Physical Performances of the Mentally Retarded." Expanding Concepts in Mental Retardation. (George A. Jervis, ed.). Springfield, Illinois: Charles C. Thomas Publisher, 1968.

[5] Programing for the Mentally Retarded: Proceedings of a National Conference. Washington, D.C.: American Association for Health, Physical Education, and Recreation, 1966. p.129-132. (out-of-print).

- "Mentally Retarded." Therapeutic Recreation Information Center, Eugene, Oregon: University of Oregon, Department of Recreation and Park Management (1607 Agate Street), n.d.

- "The Status of Physical Education for the Retarded." Louis Bowers. Physical Education and Recreation for Handicapped Children: Proceedings of A Study Conference on Research and Demonstration Needs. Washington, D.C.: American Association for Health, Physical Education, and Recreation and National Recreation and Park Association, n.d., pp. 1-6.

- Physical Education for the Mentally Retarded. John N. Drowatzky. Philadelphia, Pennsylvania: Lea & Febiger, 1971.

- "Physical Fitness and the MR: A Review of Research." Jack Campbell. Mental Retardation 11:5: 26-29; October 1973.

- Motor Activity and the Education of Retardates. Second edition. Bryant J. Cratty. Philadelphia, Pennsylvania: Lea & Febiger, 1974.

- "Studies Related to Moderately (Trainable) Persons." Janet A. Wessell, et al. Challenge 10:2: February-March 1975. Washington, D.C.: American Alliance for Health, Physical Education, and Recreation.

Rapid increase in research activity in this area resulted in many different agencies being involved in performing, reporting, and reviewing these studies, projects, and activities. Because of diverse sources and the variety of forms in which these materials are found and demands of personnel in the field, expansion of the original 1966 document was undertaken. Abstracts of as many studies in this area as possible have been included in this publication. As a further aid to personnel, this volume has been completely indexed and cross-indexed for ease in and efficiency of use. After a cutoff date for abstracts had been established, an addendum containing only bibliographic data about studies was developed to provide entre to and information about as many additional studies as possible. Whereas close scrutiny of the 1966 bibliography revealed non-research entries, every effort has been made to include only research materials in this volume.

In general, the following guidelines and criteria were applied to research studies, demonstration projects, and related activities as bases for inclusion in this annotated research bibliography:

- Minimum pre/post measures, case studies, surveys, historical, philosophical, descriptive, basic, experimental, applied, and other legitimate research designs and methodologies including demonstration projects with strong evaluation components.

- Subjects or participants with any degree of mental retardation--i.e., mild, moderate, severe, profound--or combination of impairments, disabilities, and/or handicapping conditions as long as mental retardation was identified.

- Broad interpretation of physical education, recreation, and related programs and activities, and of psychomotor function.

These abstracts contain, in general, statement of purpose, information about subjects, data about evaluative instruments and assessment tools, and basic findings and conclusions as reported by the researchers themselves. Little is included about research design, statistical treatment, level of significance or research methodology.

This volume is not presented as an exhaustive or all inclusive study of research in physical education, recreation, and psychomotor function of mentally retarded persons. Rather, it is designed to present comprehensive information about and detailed analysis of research in these areas and to provide persons who work with and serve retarded individuals and groups information they can use and apply to improve activities and opportunities in their programs. Therefore, as you refer to these abstracts and study all aspects of this bibliography consider these points:

- This research bibliography is just one more step in bringing together a substantial portion of known research in physical education, recreation, and psychomotor function of mentally retarded persons. Now in printed form, within the confines of one volume, can be found abstracts of a large number of research studies, listings of additional studies, and other helpful material for persons who work with and serve retarded individuals and groups. Because of the expansiveness of this volume it will be left to other times and publications to provide more in depth analyses and synthesis of research findings and empirical evidence related to specific areas, activities, and elements of motor activity movement, physical development and recreation for populations of mentally retarded persons.

- Terms for certain concepts as expressed in individual abstracts are not consistent. Terminology, characteristic of the time specific studies were done, unique to certain disciplines or specializations, and associated with different countries has not been changed. Basically, terms used by researchers themselves were left intact. For example, words such as moron, feeble-minded, idiot, and imbecile can be found along with educable, trainable, custodial, mildly, moderately, severely, and profoundly mentally retarded; familial, organic, endogenous, and exogenous are also commonplace terms in some studies. In addition, many researchers have used interchangeably such terms as motor proficiency, motor ability, motor fitness, motor efficiency, physical fitness, physical development, and physical efficiency without clearly defining and delimiting their meanings. Consequently, there are studies that propose to measure the same characteristics but that actually measure quite different characteristics. Other studies purport to measure different traits while they actually deal with the same traits. Procedures used in indexing this volume were designed to minimize some of the problems, created by

such semantic idiosyncrasies. However, it must be remembered that contents of this volume cover almost an entire century--prior to 1900 to 1975; during this period concepts and vocabulary have changed dramatically.

With full recognition of various limitations of research in general and that included in this bibliography in particular, review and analyses of these studies reveal: [6]

- Physical fitness, motor ability, and physical proficiency levels of mentally retarded persons can be improved; increasingly mildly (educable) retarded persons are achieving physical and motor tasks in same distribution found in the general population. While current research is not as definitive in this respect for moderately (trainable) retarded persons, recent trends from studies, empirical evidence, and subjective observation suggest higher motor and physical potential than has been reported or expected.

- Evidence suggests that the motor abilities of moderately and mildly retarded children are organized similarly to those of normal children and that attainment of these abilities follows similar developmental curves for both groups.

- Retarded persons can learn all motor skills their nonretarded contemporaries learn; there is a great deal of overlap in performances of mentally retarded and nonretarded individuals.

- Retarded children and youth can profit from the same kind of motor experiences as normal children, provided the stage of learning and the how to is congruent with learning characteristics of retarded populations.

- Physical education and recreation activities must be broken down into small components and a basic simple to complex principle of teaching fully used.

- Motivation and individual success are cornerstones for a successful overall program; success breeds success and often leads to reversal of the failure frustration cycle in which so many retarded persons have been locked. Self concept, self-confidence, and self-image can be improved through active participation in physical education, recreation and psychomotor activities by retarded persons of all functional levels.

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[6] Readers are encouraged to review indicies and related content analyses in this volume for additional information and material dealing with research trends in these areas of concern.

- Retarded persons of all ages can accomplish worthwhile objectives when provided with appropriate, sequential, and progressive programs and opportunities within the scope of their individual abilities.

- Little is known about relative effectiveness of various types of programs. Information related to effects of duration, teacher type, time/day, reinforcement, retention, and teaching strategies are lacking.

- Little transfer of skill has been shown from one activity to another. Conversely, there is great specificity in motor activity and learning as transfer appears to occur only under specific conditions.

- Substantial correlation between motor performance, physical proficiency, and intelligence has been noted in mentally retarded subjects, especially those at lower functional levels--i.e., severely, profoundly, and some moderately retarded persons.

- Novelty activities, motivational devices, unusual programs, and a variety of methods contribute to successful performance and in stimulating retarded persons to achieve.

- Fine motor skills appear to be an important attribute in developing vocational skills that can be used in sheltered workshops or in jobs per se.

- Social relationships, peer acceptance, and other indicators of true group interaction and integration do not automatically result for retarded children through active participation in physical education, recreation and related activities. Although some studies have shown positive relationships among a variety of physical/motor and social characteristics, others have shown retarded youngsters in both regular and special physical education programs less accepted and more rejected at the end of such experiences than at the beginning.

- Today information and generalizations about physical fitness, motor ability, and physical proficiency levels of moderately (trainable) mentally retarded persons are made in the same ways they were made about mildly (educable) retarded persons five to fifteen years ago. Research, empirical, and practical experiences gained from extensive work with mildly retarded persons are being shown applicable and appropriate to moderately retarded populations.

- Bases for research studies, project support, program efforts, and statements about physical fitness, motor ability, and physical proficiency of mentally retarded populations continue to be dominated by statistics and results of studies at least six or seven years old. Little use or application of findings from recent studies have been noted.

- Differences have been found in studies involving institutionalized populations and those enrolled in public school programs. In general, those from residential facilities have consistently scored lower than those in public school programs.

- Specific contributions of active participation in physical activity programs to other facets of a mentally retarded child's education and development have been reported. These activities have served as bases for art projects, English assignments, oral expression, safety lessons, and arithmetic manipulations. Self-concept has increased; greater vocational productivity has resulted; and a variety of speech impairments have improved in the stress-free, noncompetitive, and accepting environment of these programs which were helpful to the individual in building self-confidence and becoming better able to deal with stresses of everyday life.

- Although certain areas and topics have been studied much more than others, a great deal of this repetition has been duplication rather than replication, application of findings, or pursuing research recommendations.

- It is clear that performances of mentally retarded persons can be improved by programs of physical activity. It is also apparent that most studies reported do not provide replicable forms of instruction which effectively modify motor performances of mentally retarded participants. Ability of a study to be replicated is of crucial importance and has been completely ignored in reporting results of most studies. Presumably, when a study is conducted there is a rationale for the program and selection of dependent measures. In instances where significance is obtained, and others would like to implement an effective treatment, it is not enough to report the program in terms of a general descriptive statement or even reference to a book or guide which provides a complete description of that treatment. To take this approach forces one to make the assumption that the program occurred as intended or as described; anyone who has taught in public schools is quite aware of the fallacy of this assumption. The important information necessary to replicate is that information which describes what did occur, not what was intended to occur. This same information is equally important for the full interpretation of nonsignificant results as for significant results. Of crucial importance to improving motor performance capacity of mentally retarded persons are systematically designed, replicable physical education, recreation, and psychomotor function materials which have been evaluated and deemed effective by evidence collected.[7]

While many of these findings are little different from reviews and analyses reported as much as twelve years ago, more studies, reports, and evidence make statements more positive and definitive; questions and suppositions of the past

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[7]Wessell, Janet A., et al. "Studies Related to Moderately (Trainable) Persons." Challenge 10:2: February-March 1975. Washington, D.C.: American Alliance for Health, Physical Education, and Recreation.

now can be answered with research, empirical and experimental evidence.[8] Analyses suggest unanswered questions that need to be proved in future studies, projects, and programs. For example:

- How does the Hawthorne effect influence results and performances of retarded persons in physical education, recreational and/or psychomotor activities?

- Do retarded participants accomplish more in the mainstream or when they participate exclusively in special/separated programs and activities? How can determinations be made when an individual is ready to participate in regular programs and when he should remain in special programs and activities? Do certain activities lend themselves more to mainstreaming and others to participation in special programs? Are certain activities more appropriate for homogeneous groups based on handicapping condition, level, or retardation, and/or skill levels and others for heterogeneous groups?

- What are needs for more studies on influences of recreation participation and activities on mentally retarded participants? (There are now substantially fewer studies in recreation than in physical education).

- What are influences of intellectual loading on results of studies and findings in these areas?

- To what extent can and should mentally retarded persons at various functional levels be encouraged and allowed to be their own advocates for educational and recreation programs and activities including at decision and policy making levels?

- What is really being measured by various test/evaluation instruments, batteries, and items? (This is especially crucial in that the same devices have been used in study after study and program after program). How do these instruments in themselves affect results, conclusions, findings, and generalizations made from their use?

- What are effects of continued utilization of research results from studies reported five to ten years ago (as opposed to more recent projects with opposing findings) on programs, expectations, and development of individual retarded persons?

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[8] "What Research Says About Psychomotor Function of the Retarded," Journal of Health, Physical Education, Recreation, April 1966 (Vol. 37, No.4), p. 36, and "Motor Function and Physical Fitness of the Mentally Retarded," Rehabili-Literature, August 1963 (Vol. 24, No. 8), p. 230, provide additional discussion of research needs in this area.

- What do test norms really indicate? What do they tell? To what extent have norms been revised and made appropriate for different groups of subjects in various situations and under different circumstances? Are instruments appropriate for populations for which they have been designed (i.e., analyses show that the Youth Fitness Test has been used almost three times as much as the Special Fitness Test in studies involving retarded subjects)?

- What are inter and intra-etiological relationships with motor performance, physical proficiency, and movement activities?

- What effect does utilization of the same subjects in a series or several independent studies have on results and findings? What effects have test instruments and personal relationships with instructors, researchers, leaders, and testers had on findings, results, conclusions, and performance?

- How can success, feelings of accomplishment, fun, and other affective contributions be measured objectively?

- How can conflicting results in studies be rationalized and explained?

- What are effects of different types of program placement, specific activities, time allotment, and various methods and techniques on performances, test results, and research findings?

- To what extent can outdoor education, outward bound, survival and wilderness camping techniques and approaches be used to improve learning opportunities and stimulate total growth and development of mentally retarded persons regardless of severity of the condition? What other general and/or specific recreational activities have special relevance to and are applicable for retarded persons? To what extent can various recreational activities be used effectively in developing gross and/or fine motor skills, physical fitness traits, and related movement/motor characteristics?

Additional problems, issues, concerns, and needs having implications for research, demonstration, training, and service in physical education, recreation, and psychomotor function of mentally retarded persons include:

- Determine stimilarities/differences between <u>motor learning</u> and <u>learning through motor activities</u>.

- Assess relationships of motor/physical performance/processes to cognitive development, academic achievement, and social/emotional development.

- Address thoroughly issue of <u>transfer vs specificity in learning</u>.

- Identify personal characteristics, traits, and qualities that make it more/less likely that certain <u>individuals</u> will succeed/fail in specific programs/activities, in certain settings/environments, or through given methods/approaches/techniques.

- Explore various physiological parameters in terms of effects/contributions/values of certain programs, activities, modalities for retarded participants at various functional levels.

- Develop truly differential staffing patterns in projects/programs so that leader/teacher - participant/student ratios are reduced through judicious use of paraprofessional personnel supervised by well-qualified, trained, and experienced personnel.

- Compare relative effectiveness, efficiency, and competence of personnel at all program levels trained in college/university settings with persons receiving greater amounts of field opportunities and experiences.

- Compare short and long range effects of early childhood programs that place emphasis upon early cognitive function academic growth and development with programs placing greater emphasis on learning and educational processes through play, exploration, discovery, and fun; assess effects in all domains — psychomotor, affective, and cognitive.

- Identify unique roles and contributions of various disciplines, specializations, activity modalities, and organizations in meeting needs of retarded populations through greater interdisciplinary cooperation and multiagency teamwork.

- Encourage personnel at grassroots levels and in direct program service capacities to pursue <u>wildfire</u> research projects in which they set up studies in their own programs and with their own clients to obtain answers to their own questions and problems.

- Emphasize <u>applied</u> research through demonstration projects and activities that can be generalized and utilized in similar programs and activities.

- Investigate relative effects and effectiveness of play, free play, and progressively structured play situations upon total growth, development, and progress of retarded individuals at various functional levels; consider all domains in such investigations.

- Continue to make efforts to eliminate confusion in terminology and semantics rampant in education, recreation, special education, and related disciplines and specializations where the same words are used for different concepts and different words used to mean identical concepts.

- Determine course/competency needs for all school physical education teachers and community recreation personnel to enable them to deal with retarded populations in regular program settings.

- Determine personal characteristics and traits that indicate when an individual is ready to learn certain physical/motor skills most expeditiously.

- Evaluate large amount and great variety of program materials in terms of their effects on children/populations each item is designed for use.

- Determine specific contributions of physical activities, movement, motor activities, play, and recreational pursuits upon improved socialization and social function of mentally retarded persons.

- Encourage more longtitudinal and reverse longtitudinal studies in which individuals and groups are studied from the present back through events, activities, and experiences that affected their growth, development, and achievement postively as well as negatively.

- Reconsider applicability and appropriateness of research techniques, approaches, and designs effective in the physical sciences as modus operandi in the behavioral sciences.

- Use more fully information, input, and research/experience evidence from other disciplines and fields such as nutrition in programing and meeting needs of retarded participants through physical education, recreation, and related programs.

- Continue to explore and investigate effects of categorical labeling and generalizations in institutionalization and other dehumanizing activities upon growth and development of mentally retarded persons.

- Determine extent that functional characteristics, antisocial behavior, self destructive traits, and related symptoms of severely and profoundly mentally retarded persons are products of institutional life. In what ways can reflex training, infant stimulation, motor development, physical activity, and recreation programs contribute to improving personal development and quality of life of such individuals?

- Assess implications of active participation in physical education, recreation, and psychomotor activities upon prevocational readiness, vocational proficiency and related work performance of mentally retarded persons.

- Identify personal characteristics and professional competencies of teachers/leaders who function more/less effectively with specific groups/individuals, under given conditions, in various organizational/administrative structures, at different levels, and in specific program environments/situations.

What does research suggest to teachers of physical education and leaders of recreational activities for mentally retarded persons about teaching techniques? What kinds of instructional hints can be gleaned from such research? A few ideas that can be translated into action include:

- Verbal directions should be few and simple.

- Praise and encouragement are indispensible in helping to create the type of learning set most conducive to achieving progress. Even if the effort does not result in successful performance, the effort that is expended should be applauded.

- Performance is often best the first few times a skill is attempted. Practice periods should be short with frequent changes of activities to reduce frustration caused by regression in performance.

- New activities should be introduced early in the period because of the greater susceptibility to fatigue as the period progresses. The tempo of activities throughout the period should be varied to reduce this fatigue factor.

- Visual aids of all types are valuable supplementary tools.

- Patience is the prime requisite of the teacher.

- A democratic and permissive class atmosphere should be constantly maintained.

- Repetition and review of skills are needed more often than in regular classes--approach development of a skill from many different ways.

- Activities should be constantly evaluated and modified as needed.

- Classes must be well organized and closely supervised. Discipline must be firm but without threats and within the understanding capabilities of the children.

- Students should be continually restimulated and remotivated.

- Active participation by all throughout each class period should be the teacher's goal.

- Little transfer of skill is shown from one activity or skill to another.

- Kinesthesis--moving the child through a desired motion--is an excellent device that is effective with retarded persons.

- Intellectual development and physiological potential must serve as guidelines at all times.

- Instruction must be slow, deliberate, progressive, and concrete--make haste slowly.

- Wise use of leisure time needs to be a part of the teaching involved in working with retarded of all levels and ages.

- Teaching safety needs to be a part of daily instruction. Personal, school, community, and activity safety must all be included.

- Health education needs to be a part of daily teaching. Cleanliness, diet, rest and sleep, care of defects, and diseases are among the topics that should be included.

- Many retarded children must be taught to play. Things which other children do spontaneously, retarded children must be taught.

- Make the program fun for the child--be sure that he has a good time and that he experiences success and satisfaction.

- The basic play and recreational needs and interests of retarded persons are not radically different from those of nonretarded individuals and groups--they differ only in degree and in method of expression.

- A group of retarded children is homogeneous in mental impairment, yet there is a great range of physical abilities and potentials within any group; there is not as much variation from the normal in physical abilities as in mental abilities. Once motivated some retarded persons are capable of learning relatively complex motor skills.

- Selection of activities should be based on background, needs, interests, and abilities of each individual. Activities should be challenging, and there must be opportunity to introduce new ones to the group.

- Demonstration and teacher participation are both motivators and excellent teaching tools--retarded children are great mimics and like to imitate others.

- *Initiative, ingenuity,* and *resourcefulness* are *indispensible.*

INDICIES

Annotated studies and bibliographic listings in this volume can be located in at least one of the following five indicies:

- *Condition, Level, Age, and Sex of Subjects* lists studies according to basic information about subjects. For the most part, listed impairments, disabilities, and handicaps represent a multiple condition combined with mental retardation or conditions of subjects other than mental retardation. Broad age groupings are included--i.e., pre-school, children, adolescents, adults, and senior citizens. In addition to separate listings, age groupings can be found under specific categories such as mildly mentally retarded and moderately mentally retarded. Terms used interchangeably have been grouped under descriptors most generally accepted today--i.e., familial and endogenous mentally retarded under mildly mentally retarded and exogenous and organic under moderately mentally retarded. In most instances, current terminology has been used--i.e., mildly and moderately rather than educable and trainable mentally retarded, morons and imbeciles.

- *Physical, Psychomotor, Cognitive and Affective Characteristics of Subjects* lists studies in terms of significant information about general and specific characteristics and traits of subjects. In several instances families of descriptor terms have been grouped to facilitate review and search by readers--i.e., both dynamic and static balance can be found under balance; appearance, abilities/characteristics, development/growth, fitness/condition/performance/proficiency/achievement are grouped under physical; ability/skill/tasks, characteristics, educability, fitness, learning, proficiency/performance/development/function, retention and training are found under motor.

- *Physical Education, Recreation, and Psychomotor Activities* lists both general and specific activities in the areas of concern. For example, categories such as motor, perceptual motor, physical, and leisure-time activities can be found; studies are also listed according to specifics such as balance activities, art, music, toys, and movement; games such as basketball, bowling, and volleyball are listed. In several instances, subcategories are included with basic descriptors--i.e., creative, educational, modern, social, square, and therapy under dance; various types of camps under camps/camping.

- *Tests, Rating Scales, Evaluative Instruments, and Assessment Devices* lists complete batteries as well as individual items whether or not a part of a larger device. When a complete battery has been used, it is listed in this way--i.e., Youth Fitness Test or Special Fitness Test, Cowell Personal Distance Scale. If only selected items from test batteries or from several instruments were used, they are listed according to the individual item--i.e., bar hang, sit-ups, vertical jump. As much as possible revised or adapted versions of the same basic test are specifically identified--i.e., various revisions of

Oseretsky Tests of Motor Development can be found under this basic descriptor.

- *Miscellaneous* lists descriptors not applicable to or appropriate for any of the other four indicies. Included are broad program areas--i.e., physical education, adapted physical education, community recreation, municipal recreation, recreation, therapeutic recreation; methods and approaches--i.e., behavior modification, core curriculum, individual prescriptive programs; basic research methodology--i.e., case studies, factor analysis, surveys; resources--i.e., bibliographies, research reviews. Additional descriptors include terms such as accidents, safety, health, Hawthorne effect, integrated programs, and facilities.

The following information is presented to acquaint readers with additional procedures used in the indexing process:

- Descriptor terms were developed on the basis of all available information about annotated studies--i.e., annotation, study itself, and additional information possessed by individuals who worked on this volume. Descriptors were based solely on information contained in titles for studies in which only bibliographic citations are listed in this publication.

- Studies, wherever possible, were listed in the most appropriate index even though the same basic descriptor is included in two or more indicies. For example, even though perceptual-motor can be found in several indicies, studies listed under personal characteristics focus on this specific aspect of subject development while studies listed under activities focus on actual activities.

- Cross referencing indicators refer only to related descriptors in that index and do not refer to other indicies. When using these indicies, readers are encouraged to review appropriate descriptors in all five indicies to make sure no appropriate studies or listings are missed.

- Two terms--See and See also--have been used in the cross referencing process. See refers to another descriptor where all studies related to this descriptor can be located; See also refers to additional descriptors that are closely related to the topic and are appropriate for review.

- Regular numbers in all indicies refer to annotated entries; italic numbers refer to bibliographic citations.

Every effort has been made to develop these indicies so they are of greatest possible value to readers and reduce individual search time for researchers and practitioners alike. Your input, reactions, and suggestions, of ways in which these indicies can be made more efficient and effective will be helpful in future projects of this type and greatly appreciated by involved staff. Send general and specific comments to Director, IRUC, c/o AAHPER, 1201 16th Street, N.W., Washington, D. C. 20036.

Condition, Level, Age, and Sex of Subjects

Adolescents--241,*87,201,253,275,280,295,342,346*
Adults--179,180,181,182,196,243,258 272,347,357,*194,245,246,275,280,283,287,288,289,307,320,332,394*
Autistic--*47,393,406*

Birth Injured--222
Blind--10,23,58,290,369,*230,303*
Brain Damaged (see also mildly mentally retarded brain damaged/injured and moderately mentally retarded organic)--282,304,337,372,406,*40,41,52,71,112A,114,136,160,186,188,219,228,231,262,344,409*

Cerebral Palsied--114,136,162,232,*115,229*
Children (see also mildly mentally retarded boys, girls, boys and girls, and moderately mentally retarded boys, girls, boys and girls)--262,322,351
Chronaxia--222,223,
Culturally Deprived--238,239,*57,253*

Deaf--23,*178,230*
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Delinquent--315
Downs Syndrone--10,55,77,103,107,141,142,160,221,227,243,267,286,287,301,302,320,322,406,424,*78,112,116,155,170,192,218,219,239,300,312,327,388,392*

Educable Mentally Retarded (See Mildly Mentally Retarded)
Educationally Handicapped (see also Learning Disabled)--103,121
Emotionally Disturbed--10,121,172,176,201,405,418,*13,231,295*
Encephalitic--77
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Epileptic--10,*418*
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Familial (see Mildly Mentally Retarded)

Hydrocephalic--77
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Mildly Mentally Retarded--1,2,4,6,7,9,11,12,13,14,15,16,17,18,19,20,21,23,24,25,28,29,39,40,41,42,45,46,47,51,58,59,112,114,172,188,189,193,205,213,229,231,244,248,250,255,270,290,291,299,303,307,308,310,313,314,317,319,339,346,348,352,356,359,360,361,376,378,380,381,383,385,387,403,407,408,412,417,425,428,429,431,432,438,*1,2,3,6,15,32,39,50,51,54,57,62,68,71,73,82,95,99,101,104,107,119,124,128,145,146,149,150,152,156,157,162,181,187,189,203,221,225,233,236,237,242,249,259,271,275,291,292,293,298,313,314,317,321,331,333,334,335,336,346,358,365,378,382,384,386,400,412,414*

Adults--251,272,288,384,395
Boys--2,8,12,16,21,26,31,67,68,75,78,79,82,84,86,91,95,132,138,151,156,162,169,170,174,183,206,207,208,209,210,226,235,245,261,276,277,278,279,280,306,323,330,333,334,335,342,343,351,384,386,411,*85,174,215,383*
Boys and Girls--4,6,9,11,13,14,15,17,18,19,39,40,41, 42,66,72,73,76,77,80,81,83,87,93,100,101,103,106,111,117,119,122,123,133,135,136,139,141,143,145,146,147,148,150,152,155,157,164,167,168,186,237,239,246,247,264,266,269,281,296,300,338
Brain Damaged/Injured--12,14,16,51,72,105,110,113,121,136,160,166,192,193,201,204,240,299,312,432
Elderly (see also Senior Citizens)--59
Endogenous--34,70,180,291,372,414
Familial--35,36,77,105,141,192,312,372,415,*103,160,219*
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Non-Brain Damaged--12,14,16

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Adults--196,272,*171,241,379*
Boys--27,53,54,56,63,78,79,94,104, 132,174,184,236,324,325,386,399 401,410,419,*55,56*
Boys and Girls--50,52,57,61,62,65, 77,83,88,89,97,103,106,109, 118, 123,133,136,137,141,143,150,153, 158,159,160,161,165,172,175,199, 211,212,213,252
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Pre-School--238,*20,37,173,232,267, 333,340*

Semi-Ambulatory (see also Non-Ambulatory) --58,61,
Senior Citizens (see also Mildly Mentally Retarded Elderly)--59,176
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Athletic Ability/Achievement-- 39,141,276,*32*
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Awkwardness--208,209,210,*293*

Balance--50,61,82,100,122,132, 136,137,141,169,190,196,206, 208,209,228,253,258,308,318, 339,364,374,392,399,425,*48,49, 101,352*
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Body Image--106,136,168,378,429, 430,*75,97,319,384*
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Body Mechanics--165
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Bone Development/Osification-- 301,302

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Catching Ability--19,50,331,*196*
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Dominance--212,429
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Emotional Adjustment--21,41,51,59,66, 240,242,280,295,299,351,407,*144,257*
Endurance--84,172,206,233,273,330,364, 377,424
Equilibrium (see Balance)

Fatigue--361
Finger Dexterity (see also Manipulative/ Manual Dexterity/skills)--309,*365*
Flexibility--12,16,23,196,227,233,240, 383,395,*352*
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Grip Strength (see also Muscular Fitness and Strength)--41,190,216,221,260,335, 361,363,412
Growth (see also Physical Development)-- 6,85,278,341,*254,304,387,392,416*

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Height--256,260,406,439,*91,151,387,416*
Hopping Ability--194,208,209,252,255,347
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Illness--217,283,359,*220*
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Intelligence (see also Mental Functions) --21,25,37,39,40,44,51,55,56,57,60, 64,66,73,95,96,107,109,111,116,127,

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308,319,337,353,368,369,374,400,
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Motivation (see Reinforcement and Rewards)--31,66,72,120,125,
142,163,177,228,275,333,339,363,
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Motor
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Educability--148,163,178,276,360
Fitness--40,75,206,*361,363,368,370,371*
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167,171,215,*5,32,216*
Proficiency/Performance/Development/Function--1,56,57,72,76,80,81,91,
109,111,119,141,169,170,177,181,183,
186,190,193,194,196,198,218,220,221,
222,229,238,253,271,286,295,296,297,
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383,398,404,420,428,436,*40,50,52,53,*
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347,384
Pattern Walking--207
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102,103,129,136,139,152,153,155,157,
166,201,205,222,239,268,336,345,388,
390,407,429,430,431,*41,74,74,76,77,85,*
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Fitness/Condition--6,21,25,44,48, 53,54,65,67,68,72,74,75,76,80, 81,84,85,95,96,106,113,120,123, 133,156,158,159,160,163,172,174, 175,196,199,203,213,214,226,233, 236,237,242,256,258,273,276,277, 278,279,283,303,313,334,355,340, 342,343,345,352,353,370,377,381, 398,400,401,402,404,418,423,*15, 43,65,83,99,113,122,123,143,147, 194,228,287,288,289,313,314,321, 343,344,364,396,404*
Performance/Proficiency/Achievement--6,55,84,123,173,181,225, 249,291,333,345,363,368
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Power--72,82,141,172,206,258,377
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Retention--79,130,142,200,274,318,347, *17,196,350*
Rewards (see also Motivation and Reinforcement)--38,*27,200*
Running Patterns--2,81,85,347

Self-Concept--96,150,163,201,206, 233,241,242,335,404,407,433,*414*
Self Help Skills--*164*
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Speed--82,141,206,330,364,377,386
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Steadiness--361
Strength--12,16,23,44,72,82,84,116,132, 141,149,158,172,182,206,233,258,272, 273,330,361,364,370,377,395,424,*55, 271,287,290*

Tactile/Kinesthetic Perception--282, 312,339,365,393,*40,218*
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Throwing Ability--17,50,79,178,190,203, 326,331

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Visual Motor--166,271,308,365,417,*22, 160,408*
Visual Perception/Discrimination--4,40, 232,243,271,384 388,429,431,437,*7, 104,115,210,212,229,378*
Vocational Abilities/Adjustment--7,85, 89,97,123,162,181,182,233,272,274,295, *83,99,246,275,287,290,394*

Walking Agility--252,347,426,*210,247,332*
Weight--256,260,262,406,439,*91,113,151,387,416*

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Art Therapy--250
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Ball Activities--81,136,147,326,331,380,403,*82,196*
Baseball--358
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Biorhythms--362,*402*
Bowling--117,331,427,433

Calisthentics (see also Exercises)--254
Camping/Camps--3,25,311,358,*61,112A,126,131,215,223,296,297,338,351,381*

Day Camps--25,70,170,174,315,340,*24,161,166,167,347*
Residential Camps--*113,228*
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Dance Therapy--395
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RESEARCH ABSTRACTS

1. ADAMS, Kela O. *The Effects of Adapted Physical Education Upon the Social Adjustment and Motor Proficiency of Educable Mentally Retarded Girls.* Doctoral dissertation. Bloomington: Indiana University, June 1970.

This investigation was designed to determine effects of a one-semester adapted physical education program on motor proficiency and social adjustment of educable mentally retarded (IQ 50 to 79) junior high school girls. Three treatment groups were randomly selected from two public junior high schools. Experimental subjects (N=21) were taught in adapted physical education classes by the experimenter on alternate days for one semester. Control groups (one of 20 EMR's and the other of 23 intellectually normal girls) remained in regular physical education classes in their schools. Subjects were tested prior to and following the semester. Comparisons were based on scores on the KDK-Oseretsky Tests of Motor Development, Cowell Social Adjustment Index, and Cowell Personal Distance Scales.

The researchers found that: 1) intellectually normal girls were superior in motor performance to mentally retarded girls prior to and following the semester of instruction in physical education. Retarded girls made significantly greater gains than normal girls regardless of where they were placed in the program; 2) teachers' judgments of social adjustment significantly favored normal subjects on initial and final ratings. However, net gain scores of EMR experimental subjects reflected a significant improvement at the .01 level; the net *loss* scores of the EMR control group indicated a significant loss in social adjustment at the .25 level. Net gain scores of the intellectually normal subjects did not reflect significant improvement; and, 3) peer acceptance scores favored normal girls and EMR girls participating in the adapted program. The only significant *loss* in peer acceptance was noted among EMR girls participating in the regular physical education program.

2. ADRIAN, Marlene J. and David Auxter. "Characteristics of the Running Patterns of Mentally Retarded Boys." *Abstract of Research Papers, 1967 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1967.

Running patterns of educable mentally retarded boys were analyzed to identify developmental trends and to compare findings with similar data obtained from normal children. Subjects (N=46, CA 8 to 12)

that did not include gross motor activities. Mean scores of both experimental and control groups showed improvement on all criterion measures between pre and post tests. However, when the analysis of covariance was applied, no significant differences were evident between adjusted post test mean scores of the two groups. In terms of subsequent sensory-motor, visual motor, and perceptual and concept formation performance, this suggested that there was no advantage in having educable mentally retarded children participate in a systematic sensory-motor program in lieu of general special education classroom activities.

5. AMERICAN Association for Health, Physical Education and Recreation. *Rules Affecting the Eligibility of the Mentally Retarded for Interscholastic Athletics: A Survey of State High School Athletic Associations*. ED 083 209. Washington, D.C: The Association. n.d.

This survey of state high school athletic or activity associations (98 percent returns) was conducted to determine national trends in and specific procedures for establishing eligibility of mentally retarded students for interscholastic athletics. Specific questions focused on 1) criteria to determine eligibility of mentally retarded students, 2) limitations placed upon their participation, 3) rationale and reasons why they were denied opportunity to participate, 4) plans being formulated to change rules to grant their eligibility, and, 5) differences in rules for mentally retarded students enrolled in special classes in regular schools and for those enrolled in special schools. Results showed that in 22 states (44 percent) mentally retarded students were eligible and did participate, in 10 states (20 percent) they were eligible on the basis of broad interpretation of association by-laws, and in 17 states (34 percent) they were not eligible, usually because of not meeting scholarship or academic eligibility rules. The report presents rationale for and against eligibility of retarded students, suggests criteria, and makes recommendations for states to consider where retarded students are not eligible for interscholastic athletics.

6. ASMUSSEN, Erling and K. Heeboll-Nielson. "Physical Performance and Growth in Children: Influence of Sex, Age, and Intelligence." Journal of Applied Physiology 8: 4: 371-380; January 1956.

Purpose of this investigation was to explain possible effects of sex, age, and intelligence on qualitative development of certain physical abilities. Subjects (N=338; 214 public school girls, CA 7 to 16; 62 public school boys, CA 7 to 16; 62 boys from a special school for the retarded, IQ 70 to 90, $\bar{X}$ 83 as measured by the Binet test) were tested to determine maximum strength of leg extensors and finger flexors, maximum expiratory and inspiratory force, and maximum heights of standing vertical jump. Measurements were also taken of subjects' standing and sitting heights, trunk length, and

were divided into five age groups. A 16mm camera set at 64 frames per second was placed 90 feet from the performance area and films were taken of the middle four strides of a 30 yard run. Reference markings were placed on limbs of subjects and two yardsticks were placed in the camera field. Tracings were made of each take-off and landing frame. The following factors were identified: 1) speed of the runner, 2) percentage time in flight, 3) stride length, 4) contact time, 5) foot position at landing, 6) angle of swinging knee at take off, and 7) at landing, 8) angle of swining thigh with the horizontal at take-off, and 9) arm position at take-off and 10) at landing. Means and standard deviations were computed and comparisons were made with comparable data based on performance of normal boys. Graphs were made and developmental trends of the two populations compared. Findings confirmed research showing that running speed of mentally retarded boys was slower than that of normal boys. In addition, performance of mentally retarded boys differed from the normal population in all factors measured. However, few differences were found in the performance of mentally retarded boys in different age groups.

3. ALLEN, R. M. "Note on Mixed Summer Camping with Retardates and Non-Retardates." Training School Bulletin 54: 50-51; November 1957.

This observational study of five non-retarded and five retarded campers (boys and girls; CA 7 to 12) showed little voluntary and spontaneous mixing between non-retarded and retarded children. Although mental ages did match exactly, there was sufficient intellectual overlap so that a single activity could be planned for both groups and all campers could complete the camping period with similar accomplishments.

4. ALLEY, Gordon R. and Donald L. Carr. "Effects of Systematic Sensory-Motor Training on Sensory-Motor, Visual Perception and Concept Formation Performance of Mentally Retarded Children." Perceptual and Motor Skills 27: 451-456; 1968.

The purpose of this investigation was to study effects of an extended, systematic training program of sensory motor activities (Lincoln-Oseretsky Motor Development Scale and Purdue Perceptual-Motor Survey), visual perception (Benton Visual Retention Test, Kuhlmann-Finch Test, and Frostig Developmental Test of Visual Perception), and concept formation tasks (Illinois Test of Psycholinguistic Abilities) on educable mentally retarded boys and girls (N=56; CA 7 to 5 to 9 to 10, $\bar{X}$ 8 to 9; IQ 48 to 77). Ten identical criterion measures were administered preceding and following a two-month training program. The experimental group took part in a systematic sensory-motor training program; the control group spent the same time in regular special education classroom activities

body weight. Results showed that girls were inferior to boys in respiratory strength and handgrip, but were practically equal to boys, particularly in the younger age groups, in the vertical jump. Onset of puberty had the following effects: 1) age, beside influencing anatomical dimensions, seemed to have a positive influence on physical capacities, particularly with regard to test tasks requiring a high degree of neuromuscular coordination; 2) physical capacities of boys increased as they related to height; 3) physical capacities of girls were adversely influenced as height factors tended to reduce development of certain motor performances.

Other findings indicated that intelligence as expressed by IQ was not statistically significant in terms of performance for youngsters with IQ's above 95. However, boys with lower IQ's (average 83) performed less skillfully than boys of normal intelligence.

7. ANNETT, John. "The Information Capacity of Young Mental Defectives in an Assembly Task." The Journal of Mental Science 103: 432: 621-631; July 1957

This investigation was designed to present ideas for new and practical approaches to some of the problems of assessing and placing mentally retardated persons in job situations based on motor abilities. Subjects (N=72; CA 16 to 21) were placed in three groups of 24 (high grade - IQ 60 or more; middle grade - IQ 40 to 59; low grade - IQ 40 or less). Subjects were assigned an assembly task in which they were confronted with an array of Braillet Pegs standing upright in a board; they had to transfer them, one by one, to a row of holes four inches away. Reach, was varied with respect to information load. Effects of practice on the peg board task were investigated. Only 36 of the original subjects, 12 from each group, participated in the final experiment.

It was suggested that movement elements such as reach, grasp, transport, and assembly had provided useful ready-made categories and that within-element variables might be subsumed under the concept of information load. Results of an experiment in which the informat on load of one of four elements was increased by a definite amount illustrated that operators behaved as though there were limited capacity channels and that low grade retardated persons demonstrated significantly poorer transmission rates than those with IQ's over 60. The same task used in a learning experiment showed that lower grade subjects, while starting off with poorer performance levels than others, tended to improve with more practice. While it seemed possible that channel capacity might be limited by brain pathology, the difficulty of generating neurological hypothesis from these data were underlined. Results of this study indicated possibility of using such techniques for

both selection and job evaluation and for adapting jobs to fit limitations of mentally retarded persons.

8. ANOOSHIAN, Varujan Barney. *A Survey of Problems Arising from the Integration of EMR Boys in the California High School Regular P.E. Class.* Master's thesis. Claremont, California: Claremont Graduate School, May 5, 1961.

This survey was designed to determine effects of a specific section of the California school code pertaining to the integration of educable mentally retarded boys in regular high school physical education classes was the identification of problems confronting physical education instructors of primary concern when EMR boys were integrated with non-retarded students. Different questionnaires were sent (183 of 253, 71.15 percent returned) to principals of senior high schools in California with 900 or more students and to boys' physical education instructors (100 of 148, 67.57 percent returns) who met specified criteria regarding knowledge and involvement in these programs. Major consclusions included: 1) most administrators favored continued integration of EMR students in physical education; 2) individual practices, philosophies, and personalities of instructors, as well as administrative procedures and policies of schools and their physical education programs, and personal feelings as to advisability of integrated physical education classes were important factors affecting types and frequency of problems when EMR students were integrated in physical education classes; 3) disagreement occurred with respect to number, type, and seriousness of problems arising when EMR boys were integrated in physical education; 4) integration was felt to be justified although further research was recommended since one-third of the respondents opposed it or were unsure of its values; 5) specific types of physical education instructors and programs were considered conducive to harmonious integration; 6) most physical education instructors recognized the problem, had a high degree of concern, felt they were qualified, but did not have time to work effectively with retarded boys; 7) many problems could be eliminated with administrative planning; and, 8) need to emphasize to physical education personnel the important part of play in the total education of EMR children. With minor revisions and adjustments, the average physical education class can assimilate EMR students and reduce problems arising from integration to a minimum.

9. ARGENTI, Rudolph Martin. *The Effects of Systematic Motor-Training on Selected Perceptual-Motor Attributes of Mentally Retarded Children.* Doctoral dissertation. Knoxville, Tennessee: University of Tennessee, August 1968.

The purpose of this study was to investigate effects of systematic motor training on selected perceptual-motor attributes (Cratty's Los

Angeles Test Battery) of mentally retarded children (N=39; 31 boys, 8 girls; CA 8 to 14; IQ 51 to 87) and to determine whether these same perceptual-motor attributes could be improved as a result of 15 weeks of motor training. Subjects were divided into three groups: Experimental A (EGA) participated in a systematic motor training program; Experimental Control B (ECB) engaged in free play activities; and Control Group C (CGC) went to the library and had opportunities to study and see films. Each group met three times per week, 30 minutes per session for 15 weeks. Important findings were: 1) perceptual-motor attributes were improved as a result of participation in a systematic motor training program; 2) free play activities contributed to development of perceptual-motor attributes to a lesser degree than participation in a systematic motor training program; 3) limited activity had a stabilizing effect on development of selected perceptual-motor attributes when compared to free play activities but was less effective than participation in a systematic motor training program, and, 4) CA, IQ, grip strength, and power were important factors when dealing with cross sectional groups of mentally retarded children.

10. ARJE, Francis B. and Doris L. Berryman. "New Help for the Severely Retarded and Emotionally Disturbed Child." Journal of Rehabilitation, January/February 1966.

The value of educational rhythmics, as developed by Ferris and Jennet Robins, is thoroughly discussed in this study. The importance of such programs for handicapped children is fully documented. Observation of groups of emotionally distrubed, severely retarded, epileptic, mongoloid, slow learning, and blind participants convinced the researchers that handicapped children had received much therapeutic value from participating in educational rhythmics. The flexible, individualized approach provided personalized learning experiences of motoric, cognitive, and affective types and thus offered some definitive answers to the question of how to give handicapped people rhythmic learning experiences to help them fulfill their basic human needs and to achieve success through movement.

11. AUXTER, David M. "Comparisons in Motor Learning Between Intellectually Typical and Mentally Retarded Children." *Abstracts of Research Papers, 1969 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1969.

This study was designed to compare differences in rate of motor learning, differences in learning trends, and retentive characteristics of two groups of intellectually typical children (N=16, matched by CA 11 to 1 and MA 6 to 6) and mentally retarded children (N-16; CA 11 to 2; IQ 57). Initially, each subject was given

25 trails on the stabilometer, to measure motor learning, six months later each was given five trials to determine retention. Learning was compared on selected slopes of curves, while retention was determined by using the Wilcoxson Rank Sum Test. Results indicated that while there was no significant difference in rate of learning between groups, intellectually typical children were able to achieve more since they could sustain longer periods of learning. It was also found that typical children matched by mental age had a higher retention rate than the mentally retarded children.

12. AUXTER, David M. *Differences in Performance on Slected Tasks of Kinesthesis, Flexibility, and Strength Among Intellectually Typical Boys and Non-Brain-Damaged, Brain-Damaged, and Undifferentiated Educable Mentally Retarded Boys.* Doctoral dissertation, Boston: Boston University, 1964. Article based on study, "Proprioception Among Intellectually Typical and Differentally Diagnosed Educable Mentally Retarded Boys." Perceptual and Motor Skills 21: 751-756; 1965.

In this study intellectually typical boys (N=35; CA 9 to 10; IQ 85 to 133, $\bar{X}$ 101.9) were compared with non-brain damaged (N=33; CA 9 to 10; IQ 51 to 79, $\bar{X}$ 66.1), brain damaged (N=31, CA 9 to 10; IQ 50 to 79, $\bar{X}$ 63.5) and undifferentiated educable mentally retarded (N=27; CA 9 to 10; IQ 50 to 79, $\bar{X}$ 62.0) boys in measures of kinesthesis (perception of arms in space, leg relationship while on ground, leg in space, balance or vestibular sense), flexibility (forward and backward trunk flexion, ankle flexibility), and strength (vertical jump, grip strength). Relationships of 14 variables, including those measuring kinesthesis, flexibility, and strength, among the various population groups were also studied. Intellectually typical boys were more proficient than any of the other groups on the selected measures; non-brain damaged boys were more proficient than the brain damaged boys.

13. AUXTER, David M. "Motor Learning and Retention of the Mentally Retarded." *Abstracts of Research Papers, 1968 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1968.

The purpose of this study was to determine effects of reinforced practice on learning and retention of a gross motor task by mentally retarded children (N=32; CA 10 to 12; IQ 50 to 73). Two groups of 16 subjects each from state schools in different states (Massachusetts and New Jersey) were matched according to IQ, CA, sex, and initial motor performance. The experimental group (CA $\bar{X}$ 11-1; IQ $\bar{X}$ 58) was reinforced after successful performances on the stabilometer. The control (nonreinforced) group (CA $\bar{X}$ 11-3; IQ $\bar{X}$ 57) received no reward for successful performances. Subjects in each group had 25 trials of 20 seconds each, with a 20 second interval between

trials with five trials administered on five successive days.

The experimental group was reinforced on its last 20 trials with candy after successful or improved attempts to balance the stabilometer board; the control group was not reinforced. Subjects were measured for retention of motor learning six months after the initial test.

Differences between reinforced and nonreinforced groups were significant in favor of the reinforced group. However, no significant differences were found in retention of learning between reinforced and nonreinforced groups.

14. AUXTER, David M. "Motor Learning of Mentally Retarded, Brain Injured, and Familial Children." *Abstracts of Research Papers, 1970 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1970.

This study of familial mentally retarded (N=22; CA $\bar{X}$ 13-11; IQ $\bar{X}$ 59) and brain-injured mentally retarded (N=22; CA $\bar{X}$ 14-1; IQ $\bar{X}$ 55) children was made to compare rates and amounts of learning, and to examine possible differences in learning trends. Each subject performed 25 trials on a stabilometer to measure motor learning; five successive trials with 20 second rest intervals were completed on five successive days. Findings showed 1) no significant differences in rates of learning on early trials of the learning task between familial and brain-injured mentally retarded children; 2) learning plateaus and decrements in performance in brain-injured mentally retarded children appeared earlier than in familial mentally retarded children; and, 3) over the entire study familial mentally retarded children learned significantly more than brain-injured children on motor learning tasks involving rapid adjustive movements.

15. AUXTER, David M. "Reminiscence Among Mentally Retarded and Normals as a Function of Age." *Abstract of Research Papers, 1971 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1971.

This study was designed to compare mentally retarded and normal populations on reminiscence as it relates to age. Two groups of normal subjects (group #1 - N=20; CA 9 to 11, $\bar{X}$ 10-1; group #2 - N=20; CA 15 to 17, $\bar{X}$ 16-2) two groups of mentally retarded subjects (group #1 - N=20; CA 9 to 11, $\bar{X}$ 10-3; IQ 50 to 74, $\bar{X}$ 58; group #2 - N=20; CA 15 to 17, $\bar{X}$ 16-1; IQ 50 to 71, $\bar{X}$ 57) were established. The stabilometer was used to measure learning. Each subject had 20 trials; five trials were

administered on four successive days with a 20 second test interval between each trial on a given day. Reminiscence was considered increase in score due to the 24 hour rest interval between each block of five trails. Results indicated that the older normal group was superior in reminiscence during the first two post rest sessions than both mentally retarded groups, and the nine to eleven year old normal group. However, no significant differences existed between the young and old mentally retarded groups and the nine to eleven year old normal group. Findings of the study indicated 1) reminiscence was related to age among normal populations; 2) reminiscence did not appear to be related to age among mentally retarded subjects, and, 3) reminiscence was greater among 15 to 17 year old normals than mentally retarded subjects of comparable age. There did not appear to be differences in reminiscence between nine to eleven year old normal and mentally retarded children.

16. AUXTER, David M. "Strength and Flexibility of Differentially Diagnosed Educable Mentally Retarded Boys." Research Quarterly 37: 4: 455-461. December 1966.

The intent of this investigation was to compare differences on selected tasks of flexibility and strength between intellectually typical boys (N=33, grades 3 to 5; CA 9 to 11; IQ 88 to 133) and three groups of educable mentally retarded boys (N=33 non-brain damaged; N=31 brain damaged; N=27 undifferentiated or borderline; CA 9 to 11; IQ 50 to 79 as determined by neurological examinations, electroencephlogram findings, and supportive life histories. The Stoelting adjustable dyamometer was used to test grip strength and the vertical jump test was administered to measure jump and reach heights; tests of flexibility as described by Leighton were given to measure trunk flexion and extension and ankle flexion-extension. On trunk flexion and extension there were no significant differences in performance among the four groups. The intellectually typical group did significantly better than the three mentally retarded groups on tests of grip strength, vertical jump, and ankle flexion-extension. The non-brain damaged educable mentally retarded boys performed significantly better than the other two educable mentally retarded groups. There were no significant differences among differentially diagnosed mentally retarded boys on ankle and trunk flexion-extension measures of flexibility and static strength of grip.

17. AUXTER, David M. "The Throwing Patterns of the Mentally Retarded." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.

The purpose of this study was to explore developmental sequences which lead to acquisition of throwing skills among educable mentally

retarded children (N=110; CA 7 to 12; IQ 50 to 75). A spring operated movie camera set at 64 frames per second was used to collect data to study developmental throwing patterns of mentally retarded children. Developmental patterns were assessed in accord with spatial temporal integration of the body parts in the throw as compared to conceptual models of appropriately integrated throwing patterns. Analysis of data was directed toward observing the following elements of the throw: 1) amount of body rotation, 2) length of forward step, 3) temporal transfer of weight in relationship to release, 4) integration of joint actions required to throw the projectile, 5) angle of release of the projectile, 6) spatial temporal integration of component parts of the throw. The 110 throwing behaviors were classified into 16 distinct patterns which indicated progression in spatial temporal integration of more body parts. A developmental scale was constructed of patterns of throwing progression. Such a scale provided measurement and subsequent prescription of activities for engaging children in progressively more elaborate throwing patterns and integrated neuromuscular movements for throwing purposes.

18. AUXTER, David M. and Mark Runac. "Acquisition of Skill on Motor Awareness Tasks Between Kindergarten and Primary Mentally Retarded Children Through the Individually Prescribed Instructional System." *Abstracts of Research Papers, 1972 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1972.

This study determined differences in learning of motor awareness tasks between kindergarten (N=16) and primary mentally retarded children (N=16) after 18 periods of activity through an individually prescribed instruction system. A formative evaluation was performed on the program used in the study regarding effectiveness of sequentially arranged activities and use of criterion measures, and on systematic procedures for implementing an individually prescribed instruction system. Each member of one group was matched with a member of the other group on comparable program entry levels in a sequentially structured behavioral curriculum designed to develop kinesthetic motor awareness. Individual prescriptions were written for each student in a self-instructional, self-evaluative program of activities. Results showed 1) no significant differences in rates of learning for motor awareness tasks between groups, 2) children entered the motor awareness program at different levels with considerable overlap in initial motor abilities between normal and mentally retarded children, 3) children learned motor awareness tasks at different rates with considerable overlap between normal and mentally retarded children, and, 4) all children made gains

through participation in the motor awareness program.

19. AUXTER, David M. and Joanne Schucker. "Perceptual-Motor Evaluation of the Mentally Retarded." *The Best of Challenge*. Washington, D.C.: American Association for Health, Physical Education and Recreation 1971. p. 216.

Thirty-nine mentally retarded children (IQ 40 to 76, $\bar{X}$ 59; CA 7 to 15) participated in this study in which cinematographical analysis was made of them catching a ball. Eight aspects of catching behavior which depicted developmental levels of the child were identified: 1) hand-eye coordination, 2) rebound at the instant of contact, 3) stress in catching a ball, 4) direction and absorbtion of force, 5) timing in absorbing the force of a throw, 6) body equilibrium in preparing for catching, 7) bilateral symmetry in catching, and, 8) body in relation to the ball. Each of the eight factors was rated on a scale from one to six giving a possible maximum of 48 points. Each child's total score reflected his developmental level.

20. AYRES, A. Jean. "Patterns of Perceptual-Motor Dysfunction in Children: A Factor Analytic Study." Perceptual and Motor Skills 20: 2: 335-368; April 1965.

The purpose of this study was to discover and demonstrate relationships among different kinds of sensory perception, motor activity, laterality, and selected areas of cognitive function. Subjects (N=100; CA 70 to 96 months; $\bar{X}$ 81-48; IQ 71 to 139) all had suspected perceptual deficits. A battery of 35 perceptual-motor tests was given to each subject. An analysis of test scores led to the preparation of a hypothesis pointing to five syndroms characteristic of dysfunction: 1) developmental apraxia or deficits in tactile perception and finger identification; 2) tactile defensiveness represented by hyperactive, distractible behavior and deficit in tactile perception; 3) perceptual dysfunction of form and position in two-dimensional space; 4) deficit in integrating functions of the two sides of the body as shown by difficulty in left-right discrimination and avoidance in crossing mid-line of body; and, 5) perceptual dysfunction in visual figure-ground discrimination or inability to identify superimposed figures. Syndromes seemed to some degree to be expressive of rather specific mechanisms by which intersensory and motor information was coordinated to permit development of perceptual-motor ability.

21. BAKER, John W. *The Relationship of Physical Fitness to Intelligence, Academic Achievement, and Emotional Adjustment Among Educable Mentally Retarded Boys*. Master's thesis. Seattle: University of Washington, 1964

The purpose of this study was to ascertain relationships

between physical fitness (American Association for Health, Physical Education and Recreation Youth Fitness Test), and intelligence (Non-Language Multi-Mental Test), academic achievement (Stanford Achievement Test), and emotional adjustment (Student Evaluation Scale developed at the University of Washington) among educable mentally retarded boys (N=74; CA 12-4 to 17-11, $\bar{X}$ 14-10; IQ 50 to 80). Coefficients of correlation were calculated between measurements of physical fitness and each of the other variables. Analyses showed: 1) low positive but statistically nonsignificant relationship (r=.20) between physical fitness and intelligence, and 2) low positive but statistically significant relationships between physical fitness and academic achievement (r=.22) and between physical fitness and emotional adjustment (r=.32).

22. BARILLAS, Mario G. and Albert J. Shafter. "Survey of State Institutions with Regards to Swimming and Wading Pool Facilities, Especially as Applied to the Mentally Retarded." American Journal of Mental Deficiency, April 1955. pp. 568-573.

The researchers surveyed 82 institutions to determine whether they had swimming and wading pool facilities. Responses were obtained from 57 (70 percent) of the institutions with 17 reporting that they had some sort of facilities: 40 noted that they lacked swimming or wading pool facilities. Those that lacked aquatic facilities appeared to be genuinely interested in the outcome of the survey and gave various indications of having thought about the possibility of adding such facilities as soon as practical. By far the most important reason for institutions not having swimming facilities was a lack of financial support. All institutions reported that a major advantage of having swimming facilities would be recreational outlets they would provide for residents, additional advantages would be in therapeutic and social areas. Institutions that had pools all reported that swimming was the best single recreational and morale-building project they had. The researchers recommended that all state institutions initiate formal considerations for acquiring swimming and/or wading facilities for their patients.

23. BARSCH, Ray H. *A Movigenic Curriculum (Bulletin #25)*. Madison, Wisconsin: State Department of Public Instruction (Bureau of Handicapped Children), 1965.

This study describes an experimental curriculum designed to promote physiologic readiness in children. Movigenics, study of origin and development of movement patterns leading to learning efficiency, is a synthesis of many disciplines into a set of constructs, which serve as a theoretical model for an experimental curriculum. Twelve dimensions served as areas of developmental

concern in building this unique curriculum: muscular strength, dynamic balance, spatial awareness, body awareness (postural-transport orientations), tactical dynamics, kinesthesia, auditory dynamics, visual dynamics (percepto-cognitive modes) bi-laterality, rhythm, flexibility, motor planning (degrees of freedom). The author considered *Movigenic Curriculum* a supplement for existing curricula in regular elementary or secondary school classes, for deaf, blind, educable or trainable mentally retarded, or in other existing programs. It had not been fully polished, refined, or matured and needed testing in other settings by other teachers and with different children. Nevertheless, it offered promise for success for children with learning problems or impairments who were having trouble responding successfully to conventional curricula and methods.

24. BASSIN, Stanley L. and Michael Webster. "Distribution of Practice As A Factor In Mental Retardates Acquisiton of A Motor Skill." *Abstract of Research Papers, 1973. AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.

    This study was designed to determine type of practice schedule that enhanced motor performance and learning of mentally retardated individuals. Subjects (N=30; IQ 36 to 67, $\bar{X}$ 52; CA 6 to 14, $\bar{X}$ 9-0; MA 13 to 22, $\bar{X}$ 18) were matched as closely as possible according to chronological age, and mental age. Learning was measured by a modified Lafayette Pursuit Rotor with a 3/4 inch round target which rotated in a circle with a 10 inch diameter; the target rotated clockwise at 33 rpm. Each subject had 20 pre-rest trials on either a schedule of 20 seconds work and no rest, or 20 seconds work and 20 seconds rest. After a five minute interpolated rest, all subjects had seven additional trials on a 20 second work/10 second rest schedule. Results indicated that the distributed group performance was significantly better than the mass group when initial trial and final pre-rest trial scores were calculated. No significant differences were found in learning between the two groups when initial pre-rest trial and first post-rest trial scores were compared. The mass practice group demonstrated a significantly different reminiscence score from the distributed practice group between final pre-rest trial and initial post-rest trial. In view of results, it appeared that mentally retarded persons followed learning and performance profiles similar to normal subjects as reported in the literature.

25. BATEMAN, Barbara. "A Pilot Study of Mentally Retarded Children Attending Summer Day Camp." Mental Retardation 6: 1: 39-44; 1968.

    Effectiveness of day-camping programs on language development,

intelligence, and physical fitness of mentally retarded children was examined in this study. The total population was equally divided between trainable and educable retarded campers; three-fourths of the campers were between 9 and 14 years of age. Children in Camps A and B showed consistent improvement in all areas, while Camp B children increased in intellectual and language functioning only. With respect to sterilzation of the retarded attitudes of counselors' were unchanged in two camps and the percentage of counselors favoring it increased in one camp and decreased in the other.

26. BAUMEISTER, Alfred A., William F. Hawkins, and Jean Holland. "Motor Learning and Knowledge of Results." American Journal of Mental Deficiency 70: 590-594; 1966.

The researchers compared performances on Rotary Pursuit Tests of 48 normal boys (CA $\bar{X}$ 14-0) and 48 mentally retarded boys (CA $\bar{X}$ 13-9; IQ $\bar{X}$ 79.3). Test apparatus included Lafayette Pursuit Rotor, Hunter Klackounter, and a muffled 50 decible door buzzer. Subjects were given 20 trials, with rest periods of 0, 2, or 30 minutes followed by 10 more trials. Initially the normal boys performance was superior to that of the retarded boys. With practice, however, the retarded subjects surpassed the normal boys. Both groups benefitted equally from supplementary knowledge of results. More warm-up decrement was shown by retarded boys; differences were considered to result from a lack of appropriate set by retarded subjects.

27. BAYLOR, Terry LeLand. *Comparison of Heart Rates of Two Groups of Mentally Retarded Males.* Master's thesis. Austin: University of Texas, 1971.

Two groups of 12 institutionalized trainable mentally retarded males (CA 11-5 to 14-10 and 18-4 to 21-5) were monitored with a transistorized cardiotachometer under the following conditions: initial 4 1/2 minute supine resting phase, 30-second supine anticipatory phase, 12-minute progressive load-working phase while running on a treadmill, and 10-minute supine recovery phase. Analyses revealed no significant differences in heart rates as a function of chronological age. The overall nature of cardiovascular responses of mentally retarded males seemed to be typical of those of persons of normal intelligence.

28. Beaber, James Duane. *The Performance of Educable Mentally Handicapped and Intellectually Normal Children on Selected Tasks Involving Simple Motor Performance.* Doctoral dissertation. Syracuse, New York: Syracuse University, 1960.

The purpose of this study was to compare simple motor per-

formances of a group of educable mentally retarded children with those of two groups of normal children. The retarded group (N=30; MA 104 to 124 months; CA 166 to 189 months) was matched with one group of normal children on the basis of chronological age and with the other on the basis of mental age. Results indicated that educable mentally retarded and normal children of similar chronological ages differed significantly in simple motor activities as reflected by results of four selected tests--simple reaction time, rate of tapping, rate of manipulation and choice response time. However, no significant differences were observed between mentally retarded and normal children of the same mental age.

29. BECK, Harry S. "Present Status of Physical Education in Special Classes for the Educable Mentally Handicapped." American Journal of Mental Deficiency 61: 117-121; July 1956.

Every school district in Illinois having a population of between 10,000 and one million and having special education classes for educable mentally retarded students was sent a questionnaire; 60 of 62 school districts (97 percent) responded. Results showed: 1) Basic agreement on the objectives of a physical education program for educable mentally retarded students; 2) regular classroom teachers of educable mentally retarded children taught physical education in early grades and shared the assignments with physical education teachers in intermediate groups; 3) physical education teachers are usually responsible for working with students 14 and over; 4) physical education was considered important for educable mentally retarded students; 5) schools were doing very little formal research; 6) schools felt need for research in this area; 7) means of attaining program objectives differed, and, 8) preparing children for leisure time activity had been largely overlooked or ignored.

30. BELL, Clarence W. *A Comparison of Three Methods for Obtaining Maximal Oxygen Consumption in Children of Low Normal and Below Normal Intelligence.* Master's thesis. University Park: Pennsylvania State University, 1971.

This study compared three methods for obtaining maximal oxygen consumption in children of low normal and below normal intellegience. Subjects (N=144, 83 boys, 61 girls; CA 6-3 to 15-5) were assigned to one of four-age groups. After a three-minute warm-up walk each subject was sequentially assigned, based on age, sex, and order of appearance, to one of three treadmill methods. Method A was a progressive load continuous test where the subjects began walking on a 10 percent grade and the grade was increased by 25 percent every two-minutes until the subject reached a maximum. Method B was identical except that the grade was increased every

three minutes. Method C was a progressive load intermittent test where the four-minutes walked on a 15 percent grade followed by a ten-minute rest period; the grade was then increased by 2.5 percent; walking rate for all test methods was 3.5 miles per hour. Heart rate was monitored and expired air samples were collected in Douglas bags for analysis. Maximum values for oxygen uptake, heart rate and the percent grade attained did not differ significantly among the three methods. Total time involved in conducting Method C was significantly longer than Methods A and B; Methods A and B did not differ from each other.

31. BELNAP, Gordon. *A Study of Motor Characteristics of the Educable Mentally Retarded Student.* Master's thesis. Logan: Utah State University, 1965.

Twelve educable mentally retarded boys in special classes were given a battery of nine gross motor tests as a pre-test after receiving five weeks of regular physical education instruction, youngsters were given a mid-test containing the same gross motor items. During the next five weeks they were tested extensively, worked with visual aids, and were stimulated to achieve through motivational devices. They then took a final test. Achievement was compared with that of normal students, in the same school. Results showed that achievement for retarded students was markedly inferior to that of normal children in all test items. However, this study suggested that retarded children profited by participation in the same kind of motor experiences as normal children. Well organized learning experiences and patient instruction should result in improvement of gross motor abilities and should assume an important place in the education of the educable mentally retarded children.

32. BENOIT, E. Paul. "Need for More Fun for Institutionalized Retardates in the Lower Mental Age Group." American Journal of Mental Deficiency, July 1953.

This study was designed to determine the best ways to select games for use by retarded persons living in residential settings and to find the best means of integrating these activities into meaningful life-related situations. A high rate of attendance and interest were of prime concern; participation was voluntary. A questionnaire was sent to schools for institutionalized retarded persons to determine specific games felt most useful and what method of presentation elicited the greatest interest and involvement. Responses indicated that trial-and-error selection of games was most commonly used and low-interest items were eliminated.

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33. BENOIT, E. Paul. "Relevance of Hebb's Theory of the Organization of Behavior to Educational Research on the Mentally Retarded." American Journal of Mental Deficiency 61: 497-507; 1961.

This article points out the need for more study on providing programs and procedures for working with mentally retarded persons. Many important principles have been worked out on empirical rather than theoretical bases. These principles must be related and integrated into a workable theory if anything concrete is to be learned from them. In working with mentally retarded persons teachers must start with concrete realities and respect pedagogic principles. Training should be concentrated on tasks in which large objects or large muscle systems are involved. In higher forms of learning, sensory support is helpful and even vital at first, but may be dispensed with later. Writing is hard to teach because it is two steps removed from the object, so it must be reinforced, often verbally.

The author believes that Hebb's theory is relevant to the teaching of mentally retarded children. The most important thing now is that the theory be tested using appropriate experimental design suggested by the author.

34. BENSBERG, G. J. "A Test for Differentiating Endogenous and Exogenous Mental Defectives." American Journal of Mental Deficiency 54: 502-506; 1960.

This study sought to differentiate between endogenous and exogenous mentally retarded persons on the marble board test and to relate performances to other variables such as mental and chronological ages. Subjects (N=62, 31 in each group; 32 males 30 females) were paired in matched groups on the basis of IQ and chronological age. Standard procedures were used except for counting excessive jumps when a subject was unable to conceptualize the task. Results substantiated previous studies showing accuracy scores lower for endogenous, or brain-injured, subjects at any mental age level. The marble board test was useful in differentiating between performances of endogenous and exogenous retarded persons.

35. BENSBERG, Gerard J. and Gordon N. Cantor. "Reaction Time In Mental Deffectives With Organic and Familial Etiology." American Journal of Mental Deficiency 62: 534-537; 1957.

The purpose of this study was to determine whether or not etiology influenced reaction time on simple and discrimination tasks. Medical diagnoses were used in selecting 24 organic and 24 familial retarded subjects who were matched on the basis of

...onological and mental ages. Mean reaction time was computed for each subject on each of 21 trials for each task performed and comparisons made for matched pairs. The familial group was significantly faster on both simple and discrimination tasks. Correlations for the familial group were .57 for mental age with discrimination task and .64 for mental age and simple task.

36. BERGER, Andrew. "Inhibition of the Eyelid Reflex in Three Etilogic Groups of Mentally Retarded Boys as Compared with Normals." The Training School Bulletin, October 1954. pp. 146-152.

This study compared ability of three groups of mentally retarded subjects with that of a normal group in inhibiting the eye blink reflex. Retarded subjects were desiginated as *organic*, *familial*, and *psychogenic*. A total of 81 male subjects were used--each group consisted of 20 subjects except the organic group which had 21. Results indicated that the organic group experienced greatest difficulty in inhibiting the eye blink reflex, familiar subjects had the second greatest difficulty followed by the psychogenic group. All three groups of retarded subjects were significantly less successful than the normal group. There was a significant difference between organic and familial groups in partial inhibition. Results suggested that the eye blink inhibition test, after continued use and refinement, may become a diagnostic tool in determining presence of organic causes of mental retardation.

37. BERKSON, G. "An Analysis of Reaction Time in Normal and Mentally Deficient Young Men: Part I, Duration Threshold Experiment." Journal of Mental Deficiency Research 4: 51-58; 1960.

This study was designed to investigate relationships between reaction time and intelligence. Two groups of boys were matched--one group consisted of normal adolescent boys and the other of retarded boys living in a residential setting. The experiment involved decreasing and increasing intensities of visual stimuli until the subject signaled recognition of the stimulus; time required for recognition was determined. Test results failed to differentiate between groups and positive correlations between intelligence and duration of stimulus presentation were not established in this experiment.

38. BERKSON, G. "An Analysis of Reaction Time in Normal and Mentally Deficient Young Men, Variation of Complexity in Reaction Time Tasks." Journal of Mental Deficiency Research 4: 59-67; 1960.

The purpose of this study was to measure and compare reaction times of normal and mentally deficient boys in a series of tasks involving use of the hands in pressing buttons and in selecting

response buttons; a system of rewards was utilized. Speed of lifting the hands and of ballistic movements were specifically measured. On both measures, retarded boys were slower in reaction time than normal boys with the difference in reaction time increasing as tasks became more complex. There was no significant correlation between IQ and task complexity; IQ was significantly correlated with speed of initiation and performance of movements.

39. BERLANGA, Carrell Grigsby. *The Relationship Between Measures of Intelligence, Motor Ability, Athletic Ability, and Motor Learning in Educable Mental Retardates.* Master's thesis. Austin, Texas: University of Texas, 1971.

This study investigated relationships among measures of intelligence, motor ability, athletic ability, and motor learning of educable mentally retarded boys and girls (N=30; CA 10 to 16). Institutionalized EMR subjects were given 60 trials over a ten day period on two learning tests: the number of times a subject could skip rope while turning it himself during a 15-second period, and score made while tossing a volleyball over an eye-level bar at a concentric, horizontal target. Significant learning resulted on both motor tasks, and a correlation analysis revealed moderate relationships between intelligence as measured by the Wechsler Intelligence Scale, motor ability as measured by selected items of the Brace Motor Ability Test, and athletic ability as measured by the 25-yard dash, softball throw for distance, and standing broad jump.

40. BETER, Thais R. *The Effects of Concentrated Physical Education Program and an Auditory and Visual Perceptual Reading Program on IQ, Academic Achievement and Motor Fitness of Educable Mentally Retarded Junior High School Boys and Girls.* Doctoral dissertation. Baton Rouge: Louisiana State University, 1969. Related article, "Effects of Concentrated Physical Education and Auditory/Visual Perceptual Reading Programs Upon Three Variables of EMR Children." The Physical Educator 30: 3: 130-131; October 1973

This study sought to determine effects of a concentrated physical education program and a program of auditory and visual perceptual reading upon academic achievement (Gates-MacGinitie Reading Achievement Test-Vocabulary and Comprehension Wide Range Achievement Test-Arithmetic and Spelling); intelligence (Wechsler Intelligence Full Scale Tests for Children and Adults); and motor fitness (battery of ten tests) of educable mentally retarded junior high school boys and girls. Subjects were randomly assigned to one of four groups:

I--five boys and five girls in a combined program including 80 minutes of concentrated physical education and 80 minutes of auditory and visual-perceptual reading training per week; II--five boys and five girls in a program of 80 minutes of concentrated physical education and 80 minutes of classroom instruction per week; III--four boys and five girls in a program of 80 minutes of auditory and visual-perceptual reading and 80 minutes of classroom instruction per week; IV--five boys and four girls in a special education class throughout each five-hour school day.

Analyses of results indicated that: 1) physical education did not contribute significantly to improvement in selected academic areas; 2) an auditory and visual-perceptual reading program did not contribute significantly to selected academic areas; 3) reading vocabulary gains were significantly greater *without* an auditory and visual-perceptual reading program; 4) intelligence quotients were significantly improved after participation in a concentrated physical education program; 5) intelligence quotients were not significantly affected by an auditory and visual-perceptual reading program; 6) a concentrated physical education program specifically designed for educable mentally retarded children was significantly better for improving total motor fitness than an existing regular physical education program; 7) reading comprehension and arithmetic gains were significantly improved after participation in a combined program consisting of concentrated physical education activities and auditory and visual perceptual reading; 8) reading vocabulary gains were significantly greater with the traditional five-hours of instruction in a special education class than with other programs; and, 9) reading comprehension and arithmetic were significantly improved through the traditional five-hour-day school program.

41. BLATT, Burton. *The Physical, Personality, and Academic Status of Children Who Are Mentally Retarded Attending Special Classes As Compared with Children Who Are Mentally Retarded Attending Regular Classes.* Doctoral dissertation. University Park: Pennsylvania State University, June 1956. Related article, "The Physical, Personality, and Academic Status of Children Who Are Mentally Retarded Attending Special Classes as Compared with Children Who Are Mentally Retarded Attending Regular Classes," American Journal of Mental Deficiency 62: 810-818; 1958.

The purpose of this study was to compare performances of mentally retarded children in a regular classroom setting (N=50; CA $\bar{X}$ 11-10; IQ $\bar{X}$ 68.8; MA 8-1) with performances of children in a special classroom situation (N=57; CA $\bar{X}$ 12-1; IQ $\bar{X}$ 66.4; MA 7 to 9) on measures of physical, social, and emotional make-up. Records were kept of each child's height and weight and

of the number of days each was absent from school. Children took the following tests: vertical jump, grip strength, Brace Scale of Motor Ability, New York City Scales of Social Maturity and Emotional Stability, California Test of Personality, and California Achievement Tests. Based on tests results and health records the researcher concluded that: 1) mentally retarded children were less able physically than typical students; 2) the mentally retarded child in special classes appeared to have more physical defects than mentally retarded children in regular classes; 3) mentally retarded children had a greater degree of personality maladjustments than typical children; and, 4) mentally retarded children in special classes were more socially mature and emotionally stable than mentally retarded children in regular classes.

42. BOBROFF, A. "A Survey of Social and Civic Participation of Adults Formerly In Classes for the Mentally Retarded." American Journal of Mental Deficiency, July 1956. pp. 127-133.

The purpose of this study was to investigate economic and social adjustment patterns of two groups of adults (N=156, 118 males, 38 females) who, as children had been classified as mentally retarded. These adults had been in two different school programs: group #1 Special B Classes (IQ $\bar{X}$ 67), group #2 Special Preparatory Classes (IQ $\bar{X}$ 72). Different training methods and techniques had been used with each group; training periods were also of different lengths. Findings pointed to the need for increased emphasis in training in areas of civic education as reflected by voting, traffic and police records, and military service. The Special Preparatory Group had a more varied and extensive interest in social activities and leisure time activities than those who had been in Special B Classes. The Special Preparatory Group also had a better voting record and a higher percentage of persons who had gotten married. Subjects appeared to have established satisfying and desirable social patterns such as marriage, participation in sports, hobbies, and observational activities.

43. BOLDT, R. F. "Motor Learning in College Students and Mental Defectives." Proceedings, Iowa Academy of Science 60: 500-505; 1953.

This study had three main purposes: 1) determine whether or not some common experimental manipulations had similar effects on mentally defective subjects and college students, and for males and females; 2) test the hypothesis that those differences which occurred between levels of the individual difference variables were predictable on the basis of response effortfulness; and, 3) test the hypothesis that subjects performing at high levels of effortfulness relative to the subject had a steeper performance curve in early stages of practice than subjects performing at lower levels of effortfulness.

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Experimental manipulations chosen were effortfulness of response, indexed by block weight, distribution of practice, and stage of practice. Early in practice the learning curve of mentally defective subjects was steeper than that of college students; however, experimental manipulation of effort per response was ineffective. Performance differences between the sexes were not the same for both groups. The pattern of this effect was not in accord with the prediction based on response effortfulness. The inference was that for tasks of this sort, effort relative to the individual was not a good basis for predicting sex differences in performance patterns. Interactions of the individual difference variables were such that this study may be considered evidence that principles of motor learning based on performance of college students need not be restricted in their application to that group alone.

44. BRACE, David K. "Motor Learning of Feeble Minded Girls." Research Quarterly 19: 269-275; December 1948.

Tests of motor learning including the Brace Motor Ability Test, athletic index, strength index, physical fitness index, tennis ball bounce test, softball target throw, and soccer target kick, were given to 50 girls of low mental ability. The researcher found: 1) a slight relationship between intelligence level and ability to learn gross motor skills related to sports; 2) a greater relationship to motor learning, strength, and athletic ability among girls of low mental ability than among girls of normal intelligence; 3) a substantial relationship between IQ and a combination of motor and athletic abilities; 4) an apparent relationship between intelligence level and performance on the athletic index; and, 5) emotional reaction patterns influenced test performance scores more than physical ability.

45. BRACE, David K. *Physical Education and Recreation for Mentally Retarded Pupils in Public Schools*. ED 080 531. Washington, D.C.: American Association for Health, Physical Education and Recreation, 1966.

The final report of this national survey summarizes status of physical education and recreation opportunities provided for mentally retarded children in the nation's public schools. Questionnaires were sent to 4,022 school superintendents, principals, or teachers; results are based on 1,589 responses (37.6 percent). The final report is presented in 11 sections: 1) General Summary; 2) Primary Schools; 3) Elementary Schools; 4) Junior High Schools; 5) Senior High Schools; 6) Enrolled with Normal Pupils; 7) Schools Including All Grades; 8) Boys in Physi-

cal Education with Normal Pupils; 9) Boys in Physical Education Classes Separate From Those for Normal Pupils; 10) Girls in Physical Education with Normal Pupils; and, 11) Girls in Physical Education Classes Separate From Those for Normal Pupils.

46. BRACE, David K. "Physical Education and Recreation for Mentally Retarded Pupils in Public Schools." Mental Retardation 6: 6: 18-20; December 1968.

This study, based on a 1966 survey mailed to 4,022 (1,589, 37.6 percent, responses) public school administrators and teachers in schools having mentally retarded pupils revealed that: 1) mentally retarded pupils received little or no special attention with respect to instruction in physical education and recreation; 2) in primary schools reporting, 35 percent of the retarded pupils received no physical education, and in elementary schools 20 percent received no physical education; 3) facilities were meager; 4) a balanced physical education program was a typical rather than usual in both elementary and secondary schools; 5) health services were inadequate and left much to be desired; 6) more physical education teachers with special preparation in teaching the mentally retarded were needed.

47. BRACE, David K. "Physical Education and Recreation for Mentally Retarded Pupils in Public Schools." Research Quarterly 39: 3: 779-782; October 1968.

The researcher surveyed administrators and teachers in the nation's public schools to determine status of instruction in physical education for mentally retarded pupils. One thousand five hundred eight-nine questionnaires were returned (37.6 percent) from superintendents, principals, and teachers of mentally retarded pupils. Responses indicated that a variety of activities were being taught in about three-fourths of the elementary and secondary schools. About three-quarters of the schools lacked facilities and did not arrange for bowling, camping, corrective exercises, and swimming; one-third of the elementary schools lacked playground apparatus. The researcher concluded that 1) a greater variety of recreational activity was needed; 2) teachers needed professional preparation in working with mentally retarded children; 3) educable retarded students should be taught in physical education classes with normal students part of the time; and, 4) trainable and educable students should be separated.

48. BRADFORD, Minnie M. *A Study of the Effect of a Creative Dance Program on the Physical Fitness Level of Mentally Retarded Subjects*

at Denton State School. Master's thesis. Denton: North Texas State University, August 1967.

This study was designed to determine 1) level of physical fitness of a group of mentally retarded girls (N=62; 27 EMR, 35 TMR; CA 8 to 16); 2) effects of a creative dance program on their level of physical fitness, and, 3) feasibility of including creative dance in an overall physical education program for these girls. The American Association for Health, Physical Education and Recreation Youth Fitness Test was used as the criterion measure for EMR girls and Hayden's test of physical fitness was used for TMR girls. A creative dance program was conducted over a period of eight weeks. EMR girls showed significant improvement on four (flexed arm hang, sit-ups, shuttle run, and 600-yard run) of seven test items; TMR girls improved significantly on six of eight test items (vertical jump and bar hang were the only two in which such improvement was not found). Results indicated that mentally retarded girls who participated in dance activities tended to improve most in flexibility, bodily strength, and cardiorespiratory endurance. Creative dance appeared to be a worthwhile activity for mentally retarded girls and may validly be incorporated in a physical education curriculum. Other activities which concentrated on development of arm and shoulder strength should be included in physical education programs for EMR and TMR girls.

49. BRADLEY, A.J. "Recreation for Patients in the Institution for Mental Defectives." American Journal of Mental Deficiency 32: 301-305; October 1946.

This study was designed to examine a recreation program for mentally defective persons and indicated how a successful program could be planned and conducted. The author stressed the importance of recreators being able to recognize limitations of each individual patient and to group them according to size and ability. He suggested a recreation program of varied activities, noting degree of physical and mental ability required for participation in each activity.

Important ingredients of a good recreation program as noted by the author were: 1) facilities offering adequate space and accessibility; 2) equipment, both modern and geared towards type of patients using it; 3) enough personnel to reach each patient for five one-hour periods a week; 4) sufficient funds to run the program; and, 5) cooperation of the entire staff. The variety of activities offered and the amount of enjoyment derived from a recreation program depends largely on competence of the recreator.

50. BRITT, Gladys Glenna Gwendolyn. *The Effects of a Physical Education Program on the Balance and Coordination of the Trainable Retarded in Hampton, Virginia.* Master's thesis. Johnson City, Tennessee: East Tennessee State University, August 1968.

Purposes of this study were: 1) to determine effects of a planned program of physical activities designed to improve balance and coordination of trainable mentally retarded (N=8; CA 8-2 to 10-4; MA 2 to 4-5; IQ 30 to 60) and, 2) to ascertain effects of participating in these physical activities upon social behavior of these boys and girls. Measurements included a balance beam test (static balance), leaping footprint test (dynamic balance), throw and catch test (eye-hand coordination), and criss-cross test (eye-foot coordination); social behavior was evaluated with a rating scale developed by the investigator. Balance and coordination test items were administered four times--in September before introducing any physical activities; in December after a unit of low organized activities; in March after a unit in rhythms; in May at the conclusion of the program. Assessments of social behavior were made in September and May. Results indicated that this program of physical activities had significant effects upon balance and coordination as measured by these four tests; no significant changes occurred in social behavior.

51. BROADHEAD, Geoffrey D. *The Role of Educational Physical Activity Programs in the Modification of Selected Parameters of the Behavior of Educable Mentally Retarded Children and Minimally Brain Injured Children of Elementary School Age.* Doctoral dissertation. Madison, Wisconsin: University of Wisconsin, 1968.

Forty-nine classes of educable mentally retarded and minimally brain injured children from three Texas communities participated in 20 weeks of instructional programs. Classes were randomly assigned to one of four programs: 1) individually oriented physical activity program; 2) group oriented physical activity program; 3) art program; and, 4) regular program which served as a control. It was found that children who participated in specially planned experimental programs showed positive changes in motor, intellectual, and emotional behavior. Physical education programs were superior in altering motor behavior, and the two played equal roles in altering intellectual behavior. The individually oriented physical education program was most successful in altering motor, intellectual, and social behavior. Positive changes occurred more frequently in older children than in younger ones, more often in brain injured than retarded children and more likely among boys than girls.

52. BROWN, Joe. "Comparative Performance of Trainable Mentally Retarded on the Kraus-Weber Test." Research Quarterly 38: 3: 348-354; October 1967.

The Kraus-Weber test of minimum muscular fitness was administered to 38 trainable mentally retarded children (22 boys; 16 girls; IQ 30 to 55; CA 8 to 16) in a special school. Results showed that: 1) TMR children were seriously deficient in muscular fitness when compared with four groups of normal children; 2) TMR children were not necessarily deficient in flexibility when compared with four groups of normal children; 3) TMR girls tended to be more muscularly fit and flexible than boys; 4) greatest percentage of failures scored by TMR children was on the lower back test; 5) 63.3 percent of the 30 failures were multiple; and, 6) no differences were found between TMR boys and girls in terms of multiple failures.

53. BROWN, Joe. "Ratio of Physical Development as a Factor in Performance of Retarded Boys on Physical Fitness." Training School Bulletin 65: 1: 7-11; May 1968.

The purpose of this study was to determine whether or not performances of trainable mentally retarded boys (N=30; CA 10 to 17-4: MA 2-1 to 7-5; IQ 25 to 50) on selected physical fitness items were affected by physical development. Physical development was computed by dividing developmental age (Wetzel Grid) by chronological age. Physical fitness items included standing broad jump, sit-ups, static body balance, bar hang, 25-yard dash, back-lifts, back flexibility, one-half burpee, and leg-lifts: three test items were administered daily for three days. Subjects were placed in upper or lower groups according to degree of physical development. While results indicated a significant difference in physical development between upper and lower groups, no significant differences were found between performances of these groups on physical fitness test items.

54. BROWN, Joe. *Relationship Between Social Age and Physical Fitness Measures of Retarded Boys.* Unpublished study. Blacksburg, Virginia: the Author, Department of Physical Education, Virginia Polytechnic Institute, n.d.

This study investigated relationships between social age (Vineland Social Maturity Scale) and five physical fitness measures (Standing broad jump, for leg strength and muscular explosiveness, bent arm bar hang for arm and should girdle strength, 30-second sit-ups for abdominal and hip flexor strength, 25-yard dash for speed, and one leg stork stand for balance) of trainable mentally retarded boys (N=30; CA 10 to 17-4; MA 2 to 1-8; IQ 25 to 50) enrolled in a special school. Results showed significant correlations between social age and leg strength (r.=62), balance

(r.=54), speed (r.=56), and abdominal and hip flexor strength (r.=56); no significant relationship was found between social age and shoulder girdle strength (r.=24). Findings indicated that there was a relationship between physical skill and socialization in TMR boys and that this group of TMR boys might benefit from activities which emphasized development of strength.

55. BROWN, Billy Joe. *Some Relationships Between Intellectual, Social, and Physical Variables and Physical Performance of Selected Trainable Retarded Subjects.* Doctoral dissertation. Cincinnati, Ohio: University of Cincinnati, 1970.

This study was designed to investigate some relationships between intellectual (Stanford-Binet or Weschler Intelligence Scale for Children administered within at least four years), social (Vineland Social Maturity Scale), and physical variables (developmental age from the Wetzel Grid) and physical performance (American Association for Health, Physical Education and Recreation-Kennedy Foundation Special Fitness Test) of 179 trainable retarded subjects enrolled in a nondistrict public school for TMR in Cincinnati, Ohio. Subjects (IQ below 50; CA 12 to 19; MA 2 1/2 years or higher; developmental level not lower than three years; toilet trained; ambulatory; able to demonstrate benefits from classroom experiences) were legally excused by the Ohio Department of Education from regular school because of mental deficiency. Subjects were classified as follows: 103 males; 76 females; 122 Caucasians; 57 Negroids; 82 mongoloids; 97 other etiologies; 103 moderately retarded; 76 severely retarded. Results revealed that: 1) moderately retarded subjects performed significantly better than severely retarded on the seven items of the Special Fitness Test; 2) males performed significantly better than females on the seven items of the Special Fitness Test; 3) although Negroids had better performances on the seven items of the Special Fitness Test, no significant differences were found between Caucasian and Negroid subjects; 4) significant differences were found among performances of chronological age groups (12-13, 14-15, 16-17, 18-19) on the arm hang (arm and shoulder strength), 50-yard dash (speed), and softball throw (coordination) with the 14-15 age group having best performances on all seven items of the Special Fitness Test; 5) significant differences were found among mean performances of the social development groups on the seven items of the Special Fitness Test with high social ages having best performances; 6) significant differences were found among mean performances of the developmental age groups on the seven items of the Special Fitness Test with the 9-10 age group having best performances; and, 7) the standing broad jump best discriminated among intellectual, social, racial, and developmental age groups, and the softball throw best discriminated among sex and chronological age groups.

56. BROWN, Joe and William J. Schnitzer. "The Relationship of Mental Age to Gross Motor Performance of Trainable Retarded Boys." *Research Papers, 1969 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1969.

The relationship between mental age (Stanford-Binet) and gross motor performance (standing broad jump, 25-yard dash, 30-second sit-ups, stork stand with eyes open) of trainable mentally retarded boys (N=60; CA 12 to 17; MA 2-3 to 6-4) was studied. Results showed no significant relationship between mental age and gross motor performance of subjects tested.

57. BROWN, Joe and Don Zemanek. "Variables Affecting the Gross Motor Performance of Trainable Retarded." Paper presented at *Second International Congress of Sports Psychology,* Sport and Play for Atypical Children and Adult Section, October 31, 1968.

The researchers investigated relationships of chronological age, sex, and intelligence (Standford-Binet) to gross motor performance of 55 trainable mentally retarded children (30 males, 25 females; CA 10 to 17, $\bar{X}$ CA male 13-3, female 13-6; IQ 25 to 50, $\bar{X}$ IQ male 37.6, female 35.9). The standing broad jump, stork stand with eyes open, 25-yard dash, 30-second back lifts, back extensions, 30-second leg lifts, balance beam walk, and floor touch were used to measure gross motor performance. Results showed that neither sex nor chronological age affected gross motor performance, so that differentation for physical education based on these two variables was unnecessary. Although total gross motor performance was not affected by IQ, some shifting in rank from item to item occurred. When subjects were regrouped, moderately retarded children (IQ 40 to 50) tended to perform better than severely retarded subjects (IQ 25 to 39).

58. BROWN, Marcia Gail. *The Development of a Park Recreation Program for the Mentally Retarded at the Denton State School, Denton, Texas.* Master's thesis. Denton, Texas: Texas Woman's University, 1969.

This study describes use of a park and its facilities by moderately, midly, profoundly and severely retarded residents of Denton State School. Included in the study is a schedule of park use, description of therapeutic aspects of the program, discussion of use of equipment by retarded persons of different intelligence levels; potential use of the park by blind and semi-ambulatory residents is also discussed.

59. BYERS, Donald R. *An Activity and Rehabilitation Program by Senior Citizens for Institutionalized Mentally Retarded Aged: Boulder River School and Hospital, Montana.* Graduate dissertation. Billings, Montana: Eastern Montana College, 1968.

This study sought to investiate and evaluate a planned program of recreational services for elderly mentally retarded patients residing in a state institution. Competent senior citizens were selected to work in the program and to provide suggestions for improving it. They were compensated for their services and given the title of worker-therapist. Each worker-therapist worked directly with retarded senior citizens. Changes in both groups were assessed and a number of factors regarding adjustment, outlook, and participation were noted. Results were positive and both groups benefitted from the experience. Retarded residents improved in terms of mental, physical, and emotional functions. Worker-therapists showed positive changes in their attitudes towards institutionalized patients. The program resulted in return of more patients to their communities.

60. BYRD, Michael R. *Comparison of Motor Ability of Normal and Mentally Retarded Children at the Intermediate Level.* Master's thesis. Austin, Texas: University of Texas, 1969.

Performances of normal and mentally retarded (N=827) enrolled in intermediate grades of elementary schools were compared with those of retarded subjects (N=30) from Austin State School on ten selected items from the original Brace Motor Ability Test, standing broad jump, and 25-yard dash. Measurements of height, weight, skin-fold, and IQ were also taken. Mentally retarded children attending public schools were significantly taller and heavier but not more obese than normal children in public schools. Motor ability of normal children was considerably better than that of mentally retarded subjects enrolled in public schools. Mentally retarded children in the state institution were more obese and less capable in motor ability than mentally retarded children in public schools.

61. CALDER, Jean Elizabeth. *A Motor Age for Severely and Profoundly Retarded Children.* Master's thesis. Storrs, Connecticut: University of Connecticut, 1970.

The purpose of this study was to develop a method of determining motor age of severely or profoundly mentally retarded children and to develop pilot motor age profiles to give diagrammatic representation of range and specificity of an individual's motor ability. The researcher's object was to provide practitioners with a test to enable them to measure individual motor ability of children,

to establish current level of functioning of individual children, to use as a basis for an individualized physical activity program, and to measure a child's progress. Subjects (N=56, 37 boys, and 19 girls; CA 4-1 to 18-11, $\bar{X}$ 10-2, boys $\bar{X}$ 9-4, girls $\bar{X}$ 11-7; IQ 51 and lower) were given 83 tests, classified as to balance and maintenance of posture, locomotion, and receipt and propulsion and scored on a pass/fail basis. Long and short form tests were developed to discriminate motor age from 6 to 60 months (short form Of 41 items used only above 15-months). Items omitted to establish short form were those passed by all or almost all subjects; items below 15-month level only discriminated non-ambulatory, very low, or erratic youngsters. The researcher concluded that functional abilities and patterns of exceptional children were different from normal children as similar raw scores and motor ages provided information different from other available measures--this gave important data about severely and profoundly retarded. Specific mention was made of the importance of looking at individual motor patterns and specific abilities of youngsters rather than general trends based on such characteristics as CA, mental level, or diagnostic category.

62. CAMPBELL, Donald E. "Reliability of Cardiovascular Evaluation of Mentally Retarded Subjects." *Abstracts of Research Papers, 1970 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1970.

Purposes of this investigation were to assess test-retest reliability of a selected standardized test of sub-maximal cardiovascular performance for six trainable mentally retarded (CA 12 to 16) subjects, and to determine appropriateness and practicality of the procedure for evaluating cardiovascular performance of TMR subjects. After each subject completed two orientation sessions on a treadmill, two trials of the Balke test were administered with seven days between trials; all trials were administered while subjects were in basal states. Resting, performance, and recovery heart rates were obtained by means of wire leads from two surface electrodes to an all transistor cardiotachometer equipped w th a digital counter which was triggered by the R spike of the QRS segment of an electrocardiogram. Graphic presentation of resting, performance, and recovery heart rates for the two tests did not appear to differ in general configuration from results reported for normal subjects. Other analyses suggested that no significant differences existed between trial means for any minute of the three conditions. With the exception of the first minute of recovery, results showed a high correlation between trials. TMR subjects were cooperative and eager to perform and demonstrated an ability to learn motor skills necessary to perform a treadmill taks. Results indicated that the

Balke Treadmill test was an appropriate and practical means to obtain a reliable measurement of cardiovascular performance of TMR subjects when subjects were given preliminary orientation and experience on a treadmill.

63. CANTOR, G. N. and C. Stacey. "Manipulative Dexterity in Mental Defectives." American Journal of Mental Deficiency 56: 401-410; October 1951.

In this study researchers compared ability of mentally retarded subjects (N=174 males; CA 14 to 18; IQ 42 to 48) with that of two normal groups in completing a task of manipulative dexterity (Purdue Pegboard). Comparisons showed that retarded subjects did not score as well as normal males. No significant differences among age levels of retarded subjects suggested that individuals tended to develop maximum manual dexterity skills before reaching the age of 14. The researchers also found that boys with IQ's below 60 had substantially more trouble performing pegboard tasks than those with higher IQ's. Distribution of scores among retarded males did not differ significantly from that which might be expected on a normal curve. It was observed that many individual retarded persons were capable of performing routine manual tasks such as the pegboard.

64. CAREY, R. A. *A Comparison of the Lincoln Revision of the Oseretsky Tests of Motor Proficiency with Selected Motor Ability Tests on Boys at the Elementary Level.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1954.

The researcher administered Lincoln Revision of the Oseretsky Tests of Motor Proficiency, Iowa Revision of the Brace Test, Metheny Revision of the Johnson Test, and Cowan-Pratt Hurdle Test to 58 fourth grade, 51 fifth grade, and 60 sixth grade boys. Pearson product moment coefficients of correlation were computed among and between tests and with selected classification indices that included grade, age, height, and weight. Tests of significance and variance ratios were used to determine discrimination according to grade, age, height, weight, developmental level (Wetzel Grid), physique, as well as between boys classified as *growth accelerates* and *growth retardates*. Intercorrelations among tests indicated that each test measured a different phase of motor ability. Oseretsky and Cowan-Pratt Tests discriminated between age levels, while other tests did not. Correlations between Oseretsky Test and IQ were not significant.

65. CARRIER, Charles A., Barbara E. Humphreys, R. Walter Powell, and Kenneth W. Riddle. *A Multidisciplinary Evaluation of Trainable*

Mentally Retarded Pupils Enrolled in a Public Day School Program. Newark, Delaware: Meadowood School, n.d.

This Title I, ESEA Project was developed to provide an interdisciplinary base for a physical education program for trainable mentally retarded children (N=99; boys 50; CA 4 to 20, IQ 26 to 55; girls 49, CA 4 to 18, IQ 28 to 54) in a public day school. Roles of physician, school nurse, and physical education instructor are delineated and discussed. Medical evaluations, specialized medical referrals, and a physical fitness test (Hayden's Metropolitan Toronto Association for Retarded Children Test) were administered by respective specialists and data analyzed in several ways. Results indicated need for continued medical evaluations in developing specific programs to improve low levels of physical fitness and reduce obesity among trainable mentally retarded boys and girls.

66. CARRIER, N., L. Malpass, and K. Orton. "Responses to Learning Tasks of Bright, Normal, and Retarded Children." Technical Bulletin. Washington, D.C.: U. S. Office of Education Cooperative Research Program, 1961.

A sample of 118 children (CA 11 to 14) were matched by age and sex and classified psychometrically into four experimental groups: bright (IQ 120 to 150), normal (IQ 90 to 110), noninstitutionalized educable mentally handicapped (IQ 50 to 80), and institutionalized educable mentally handicapped (IQ 50 to 80). Subjects had six trials each on five types of learning tasks (number learning, concept formation, problem solving, perceptual-motor coordination, and verbal learning). Simultaneous and continuous measures of galvanic skin resistance, impedance plethysmograph finger volume, and respiration rate and amplitude were recorded and used as measures of emotional tension concomitants of learning. Concurrently, the amount and kind of irrelevant movements made by a subject while performing a task were observed. Children's Manifest Anxiety Scale and assessment of task motivation were also obtained. Scores from results showed that a positive relationship existed between intelligence and performance on learning tasks. Tasks requiring cognitive skills reflected this relationship more than those requiring manipulative skills. Relationships between intelligence and emotional tension, intelligence and task motivation, emotional tension and performance, and emotional tension and task motivation were less clear. The investigators felt that reliance on single types of measures for mental ability, learning, emotion, and motivation can lead to differing conclusions.

67. CARTER, John L. "Effects of a Physical Education Program Upon the Physical Fitness of Educable Mentally Retarded Boys." Texas AHPER Journal, Winter, 1970. pp. 4, 33

Basic purpose of this study was to determine if lack of opportunity was a major reason educable mentally retarded boys scored poorly on physical fitness tests. Subjects (CA 11 to 14) were divided into two groups: control group (N=18) consisted of subjects who had participated for at least one year in a daily physical education program with nonretarded boys; experimental group (N=26) consisted of boys who had not been enrolled in a physical education program. Both groups were given the American Association for Health, Physical Education and Recreation Youth Fitness Test. The control group was clearly superior to the experimental group and its percentile score (49.4) was near the national norm for 13-year old boys.

After the Test had been administered the experimental group was placed in a regular physical education program. Upon completion of 12 weeks of daily physical education, this group was again given the Youth Fitness Test. Percentile scores were raised from 34.9 to 43; this placed the experimental group within the low average range of physical fitness scores. Only a 6.4 difference existed between control and experimental groups although the former had participated in physical education for at least one year and the latter for only 12 weeks. Spectacular gains were not made on any test item by the experimental group; consistent gains were made on all test items. It appeared that educable mentally retarded boys scored low on tests of physical fitness due to lack of opportunity to participate, and physical fitness scores of retarded boys can be enhanced through participation in a general physical education program.

68. CARTER, John L. "The Status of Educable Mentally Retarded Boys on the AAHPER Youth Fitness Test." Texas AHPER Journal, May 1966. p. 8

This study provided tentative data comparing physical fitness scores of mentally retarded boys with nonretarded boys of the same chronological age. Subjects (N=44; CA 10 to 15) were enrolled in seven different special education classes for educable mentally retarded children. Eight boys participated in a daily physical education program with nonretarded boys. All of the retarded boys had been given the AAHPER Youth Fitness Test. Thirty-five nonretarded boys, for whom recent scores on the Youth Fitness Test were available, were randomly selected from the eighth and ninth grades of the local high school. All nonretarded boys were enrolled in a 45-minute

daily physical education program.

Pertinent findings included: 1) raw and percentile scores for the nonretarded group were higher on all test items than comparable scores of the retarded group; 2) total percentile score for the group of eight retarded boys who participated in a regular physical education program was essentially the same as national norms; 3) retarded boys in the physical education program scored higher on every test item but one (pull-ups) than retarded boys not in a program; 4) scores of retarded boys and the national average were more homogeneous than scores of nonretarded and the national average; and, 5) being enrolled in an organized physical education program resulted in near average physical fitness scores for retarded boys.

69. CASSEL, R. H. "The Oseretsky Tests: Vineland Adaptation." American Journal of Mental Deficiency 55: 251-256; 1950-1951.

This article presents a brief history of motor ability tests and discusses the following three aspects of the Vineland Adaptation of the Oseretsky Age Scale of Motor Proficiency: 1) rationale for adapting the test; 2) difficulties encountered in standardizing the scale; and, 3) benefits to be derived from standardization. The bibliography provides a general overview of motor ability testing to publication date and includes references for the Vineland Adaptation of the Oseretsky Tests.

70. CASSEL, Robert H. "The Performances of 54 Feebleminded Subjects." The Training School Bulletin, Supplement to 46: 4: Monograph supplement series 1: 1949.

This study describes a pilot project designed to explore the practicability of the Oseretsky Tests. Subjects (N=54; 27 male endogenous and 27 male exogenous mentally deficient persons) were given tests individually. Results showed the endogeneous group to be generally superior to the exogenous group in performance. Superiority was most evident on tasks involving integration of various sensory cues and coordination of several movements. There was less difference in performance between endogenous and exogenous groups on tasks involving single, simple meovements although the endogenous group was still superior.

71. CASSEL, Robert H. "The Vineland Adaptation of the Oseretsky Tests." The Training School Bulletin, Supplement to 46: 3: Monograph supplement series 1: 1949.

The article presents an overview of Vineland modifications and changes in the original Oseretsky Tests. Alterations in

the tests were based on research involving about 100 subjects. The adaptation is presented to clarify information pertaining to instructions, procedures, and equipment needed for normative standardization to be attempted; it is not presented as a standardized scale.

72. CAVANAUGH, John R. *A Study to Determine the Effects of a Physical Education Program on Educable Mentally Retarded and Minimal Brain-Damaged Children.* Master's thesis. Baton Rouge: Louisiana State University, August 1968.

This study was designed to determine whether mentally retarded (N=10, 5 boys, 5 girls; CA 13-3 to 17, $\bar{X}$ 14-8; IQ 59 to 79, $\bar{X}$ 67.5) and brain damaged (N=8 boys; CA 12-9 to 15-1, $\bar{X}$ 14-1; IQ 62 to 95, $\bar{X}$ 80.3) children could improve levels of motor development and physical fitness after participating in an organized physical education program for 22 weeks. Subjects participated in a special program 90-minutes per day, five days per week. The first 30-minutes of each period were devoted to activities and exercises to improve physiological function (strength, cardiovascular effiency, muscular power, and coordination); 60-minutes were used for participation in vigorous recreational games and activities with some attention directed to developing social competencies.

Progress was based on improvement shown on each of 11 test items measuring various characteristics of motor development and physical fitness. The same activities, methods, and approaches (including special motivational techniques) were used with both groups; no attempt was made to compare progress of the two groups with each other. Both EMR and MBD children showed significant improvement in muscular power, muscular strength of the legs, grip, cardiovascular efficiency, and strength-endurance of the shoulder girdle and arms. Improvement in performance of complex tasks was significant, but at a lower level of confidence than simpler tasks. The EMR group improved significantly in back and hip joint flexibility while the MBD group did not show such progress.

73. CHANEY, Rex. *The Effects of a Selected Recreational Activity on the IQ Scores, Social Adjustment, and Physical Coordination of the Educable Mentally Retarded Child.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1969.

This study was designed to determine effects of participation in a recreation program stressing dance and rhythmical activities on IQ, social adjustment, and physical coordination of 21 educable mentally retarded children. Analyses of pre, intermediate, and postest scores of youngsters randomly assigned to experimental

and control groups revealed that participation in a planned recreation program stressing dance and rhythmical activities resulted in significant improvement in IQ and physical coordination scores of these children. No significant differences were found with respect to social adjustment.

74. CHASEY, William C. "Changes in Student Clinician's Self-Perception After Working with Handicapped Children." *Abstract of Research Papers, 1970 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1970.

This study was conducted to measure changes in self-concept of 30 college student volunteer clinicians during an eight-week physical developmental clinic for handicapped children. Each clinician worked the entire eight-week session with the same child (CA 5 to 17) in wide variety of gymnasium activities, conditioning and coordination exercises, gymnastic activities, games, and modified sports to attain specific fitness-coordination objectives. Children possessed a variety of handicapping conditions including obesity, faulty vision, emotional disturbances, mental retardation and orthopedic difficulties. All clinicians and members of the control group were given the Fiedler Interpersonal Perception Scale (6 point, 24 item Bi-Polar Objective Rating Scale of Semantic Differential Type) at beginning and end of the eight-week clinic sessions. In terms of frequency and percentages, three clinicians (10 percent) viewed themselves with less favor at the completion than at the beginning; five (17 percent) were unchanged; twenty-two (73 percent) demonstrated a more favorable perception of self at the completion of the clinic; no significant change in self-perception of the control group occurred. Comparisons of pretest and posttest mean scores indicated that for clinicians as a group, these experiences resulted in significantly more favorable self-perceptions.

75. CHASEY, William C. "The Effects of Clinical Physical Education on the Motor Fitness of Educable Mentally Retarded Boys." American Corrective Therapy Journal 24: 3: 74-75; May/June 1970.

This researcher sought to determine whether motor fitness of educable mentally retarded boys improved as a result of participating in a physical development clinic one day a week for one hour for eight weeks (total of eight hours). Subjects (N=18; CA 9 to 14) participated in conditioning activities, gymnastics, games, and modified sports under the direction of college students The Indiana Test of Motor Fitness (push-ups, 20-second squat thrusts, straddle chins, vertical jump) was administered one

week before the program began and readministered at the end of the program. Results showed that the boys improved significantly in motor fitness with greatest improvement coming in squat thrusts, and straddle chins.

76. CHASEY, William C. "The Effects of Motor Development on School Readiness Skills of Educable Mentally Retarded Children." American Corrective Therapy Journal 24: 6: 180-183; November/December 1970.

This study was designed to determine effects of a concentrated physical development program on school readiness of institutionalized educable mentally retarded children. Subjects (N=36; 18 experimental; 18 controls; CA 6-1 to 12-2; IQ 50 to 85 Stanford-Binet Form L-M) were under direction of qualified female teachers and adult male and female dormitory attendants. A university physical education major was assigned to work with experimental subjects in groups of three or four in a wide variety of gymnasium and playground activities, conditioning and coordination exercises, gymnastics, games, and modified sports for one hour a day, five days a week for 15 weeks. The control group did not participate in a formal physical education program but did have free play during recreational periods. Both groups took pre and posttests consisting of five items from the Anton Brenner Developmental Gestalt Test of School Readiness (Number Producting, Number Recognition, Ten Dot Gestalt, Sentance Gestalt, and Draw-A-Man). Test results revealed that the physical developmental program did not improve scores on the Anton Brenner Developmental Gestalt Test of School Readiness and did not contribute to specific abilities necessary for success in the five subjects.

77. CHASEY, William C. "Overlearning as a Variable in the Retention of Gross Motor Skills by the Mentally Retarded." Research Quarterly 42: 2: 145-149; May 1971.

A study to determine effects of overlearning motor skills as measured by the Johnson Mat Test was undertaken. Involved were mentally retarded youngsters (N=98; CA 8-2 to 27-4; IQ 15.6 to 94.4 X 49.7; three mongoloids, three hydocephallic, 28 encephalitic, 11 cultural familial, one congenital cerebral, and 36 unknown), who were randomly assigned to learning and overlearning groups. Learning was defined as completing each of two tasks once without error; overlearning as completing each of two tasks three times without error; tasks were double hop left and diagonal hop. Subjects were retested four weeks after learning or overlearning occurred. The overlearning group maintained significant skill in completing tasks with no reinforcement and was superior to the learning group in retaining skills on the two test items.

78. CHASEY, William C. "Stabilometer Performance as a Function of Leg Strength by Mentally Retarded and Nonretarded Adolescent Males." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.

Relationships between leg strength and stabilometer performance of institutionalized trainable (N=12) and educable (N=15) retarded, noninstitutionalized educable (N=15) and nonretarded (N=15) adolescent males were investigated. Subjects were measured for leg strength, leg girth and calf girth prior to performing standing broad jump and stabilometer tests. Mean of three trials on standing broad jump and mean of ten trials on the stabilometer, each trial of 30-seconds duration with a 15-second rest period between them were used for analyses which indicated: 1) nonretarded performed better than retarded subjects; 2) EMR performed better than TMR subjects; 3) noninstitutionalized EMR performed better than institutionalized EMR subjects; 4) a progressive significant difference in stabilometer performance and intelligence levels was noted; 5) EMR performed significantly better than TMR subjects; 6) noninstitutionalized EMR performed better than institutionalized subjects; 7) stabilometer and broad jump performances correlated for all groups except TMR subjects; and, 8) no significant differences were found between the three anthropometric measures and performances on the two motor tasks.

79. CHASEY, William C. and Claudia Jean Knowles. "The Effects of Gross Motor Skill Overlearning on Retention by Mentally Retarded Males." *Abstract of Research Papers, 1972 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1972.

The purpose of this investigation was to study effects of gross motor skill overlearning on retention of institutionalized mildly, moderately, and severely male retarded subjects. Seventy-nine mentally retarded males were randomly assigned to one of two groups--1) experimental overlearning group or 2) control learning group. The criterion measure for motor learning involved accurately throwing a bean bag at a wooden target from eight and then 16 feet distances. Learning of the motor task at eight feet occurred when a subject received ten points in three consecutive throws; learning at 16 feet occurred when a subject received six points for three consecutive throws. The learning group stopped when the criterion for each distance was accomplished one time; the overlearning group continued to throw until subjects were able to complete tasks at both distances three

consecutive times. Both groups were posttested for retention after five weeks of no practice. The study revealed that the overlearning group was superior in retention to the learning group after five weeks of no practice and that overlearning was most effective for the more severely retarded subjects.

80. CHASEY, William C. and Waneen Wyrick. "Effects of a Gross Motor Developmental Program on Form Perception Skills of Educable Mentally Retarded Children." Research Quarterly 41: 3: 345-352; October 1970.

Purpose of this study was to determine effects of a concentrated physical developmental program on visual perceptual-motor skills of institutionalized educable mentally retarded children (N32, 20 experimental, 12 control; CA 6 to 12; IQ 50 to 85). Both experimental and control groups, were under the direction of qualified female teachers and adult male and female dormitory attendants. Experimental group participated one hour a day, five days a week for 15 weeks in a wide variety of gymnasium and playground activities, conditioning and coordination exercises, gymnastics, games, and modified sports; control group had no formal physical education program but did participate in free play during a recreational periods. Seven forms of the Winter Haven Perceptual Forms Test (circle, cross, square, triangle, divided rectangle, horizontal diamond, vertical diamond) were given to both groups in pre and posttest cycles. No significant differences were noted between experimental and control groups on any single item or the entire test battery--both groups improved significantly in neatness, organization, and copying the triangle.

81. CHASEY, William C. and Wannen Wyrick. "Effects of a Physical Developmental Program on Psychomotor Ability of Retarded Children." American Journal of Mental Deficiency 75: 5: 566-570; 1971.

To determine effects of a concentrated physical developmental program on motor proficiency of institutionalized educable mentally retarded children, experimental and control groups were established to measure and compare performance and improvement of subjects in each group. Subjects (N=60, 30 experimental, 30 control: CA 6-1 to 12-2; IQ 50 to 85) were chosen at random. Both groups were under supervision of qualified female teachers and adult male and female dormitory attendants. Physical education majors worked with experimental subjects in groups of three or four in a variety of physical education activities including gymnastics, tumbling, conditioning exercises, distance running, ball skills, playground and individual games five days

a week, one hour a day for 15 weeks. Subjects in the control group received no formal physical education program but participated in free play activities with subjects from the experimental group during recreational periods. The Oseretsky Motor Development Scale was administered to both groups before and after the experimental period. The experimental group made significant improvement in general static coordination, dynamic coordination of hands, simultaneous voluntary movement, and total Oseretsky score.

82. CHAVEZ, Ricardo. *Effects of Three Physical Education Programs on Selected Fitness Components of Educable Mental Retardates.* Doctoral dissertation. Hattisburg, Mississippi: University of Southern Mississippi, May 1970.

This study was designed to determine effects of three physical education programs on agility, balance, power, speed, and strength of educable mentally retarded boys (N=45; CA 6-9 to 17-5; IQ 50 to 82). Subjects were randomly selected and assigned to one of three groups on the basis of pretest scores on the five criterion measures. Groups were programmed so that Group I participated in activities related to test items; Group II spent half of each period in related activities and half in game activities; Group III took part in games only. Classes were held 30 minutes daily, five days per week for six weeks. The only significant improvement found was in the standing broad jump (power measure) for Groups I and II.

83. CHEN, Tyzz Lang. *An Experimental Evaluation of the Effectiveness of Using an Automated Gross Learning Device To Improve Neuromuscular Control of Mentally Retarded Children.* Master's thesis. College Park: University of Maryland, 1966.

In this investigation the researcher sought to determine effectiveness of an automated gross motor learning device (AGMLD) in teaching motor tasks to mentally retarded children (N=22; CA 6 to 13; IQ 40 to 70). Seven items from the Lincoln Oseretsky Test were used to measure different attributes of neuromuscular control and coordination. Experimental and control groups were paired on the basis of sex, age, and IQ. The experimental group worked on the AGMLD three times per week over a four week period (12 sessions of ten minutes each). The AGMLD involved walking and following footprints with toes turned out at 45 degrees, aligned straight, and with feet crossed over one another on each step. Although no significant differences existed between groups on the pretest, significant differences favoring the experimental group were found on six of seven posttest items--walk backwards, stand on one foot, jump over a rope,

stand heel to toe, hop, and throw a ball at a target. It appeared that training with the AGMLD did favorably influence these mentally retarded children to perform better and to exhibit greater neuromuscular control and that these tasks on this AGMLD were an effective way for improving neuromuscular control of the mentally retarded.

84. CHESWORTH, A. and J. N. Oliver. "The Physical Characteristics of Educationally Sub-Normal Boys." Special Schools Journal 45: 2: 29-32; June 1956.

This study describes types of physical activities included in a physical conditioning program for educationally sub-normal boys. It includes a detailed assessment of the physical achievement of the boys at the end of the conditioning program. Findings indicated: 1) strength and endurance of educationally sub-normal boys were as good as, and in many cases better than, that found in normal boys of the same chronological age; 2) physical performance, including skills in stunts and games, were learned quite well by these boys and in many cases were as good as that of normal children; and, 3) application of games skills to game situations was not as good as that exhibited by normal boys of the same chronological age.

85. CHIGIER, E. "The Use of a Group Approach in the Rehabilitation of Severely Retarded Adolescents in Agriculture in Israel." (Research Project VRA-ISR-23-65 of Division of International Activities, Social and Rehabilitation Services, U.S. Department of Health, Education, and Welfare, Washington, D.C. 20201.) Tel Avis, Israel: AKIM, Israel Association for Rehabilitation of Mentally Handicapped (16 Bialik Street), October 1970. (Summarized in *The Best of Challenge;* Volume II. Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.)

In applying principles of group dynamics to severely retarded persons in this Israeli project, four peer groups oriented toward becoming work groups and using a group mileu approach were established. Each group had approximately ten members and its own instructor. Chronological ages of subjects ranged between 16 and 32 years with an average of 20; mental ages were between three and eight years with an average of five and one-half. Three of the groups lived in an institution which was set up as a work colony; members of the fourth group lived at home in an urban area with their parents. An integral part of the total program was planned and systematic physical education for which each group met two mornings a week for four to four-and-a-half hours. This program included a type of cross country hiking/running,

calisthentics, mat exercises, apparatus, social games, table tennis, weight lifting, and ladder climbing. Specific recommendations and observations about the role of vigorous physical activities, importance of the leader/instructor to the success and acceptance of the program, adaptations of methods, techniques, and procedures, dispelling of certain myths and misconceptions about severely mentally retarded persons and their participation and performance in vigorous physical activities, and contributions of participation in physical activities to vocational productivity are discussed in detail. Information about growth, development, and progress of program participants is included.

86. CLAUSEN, John. "Patterns of Sensor-Motor Skills In Retardates." The Training School Bulletin 56: 2: 58-61; August 1959.

This is an interim report of a five-year project, "Ability Structure and Its Development in the Mentally Retarded," subsidized by the Public Health Service. Purpose of the study was to define subgroups of mentally retarded persons based on ability structure, rather than medical and family histories. Test batteries included items to evaluate sensory, motor, perceptual, and complex mental functions--but none to evaluate personality and emotional behavior. The report describes 34 different tests which take 12 to 15 hours to administer over a six to seven week period. At the time the report was written 200 subjects, divided into three age groups (8 to 10, 12 to 15, 20 to 24) with IQ's of 50 to 75 had been tested. Subjects (N=100) 8 to 10 years of age with a mean IQ of 100 were to be tested. Long-range plans included provisions for retesting subjects three to four years after initial evaluation to study developmental functions measured by the tests.

87. CLAWSON, Sam D. *Comparison of Perceptual-Motor and Motor Performance Levels of Higher and Lower Educable Mentally Retarded Children.* Doctoral dissertation. Columbia, Missouri: University of Missouri, 1969.

A preliminary form of the Missouri Perceptual-Motor Performance Test was given to a random sample (N=30) of Missouri school districts with special classes for educable mentally retarded children (N=1,020) to yield a profile of performance by age level (8, 9, 10, 11). Differences were examined between lower (IQ 48 to 60) and higher (IQ 66 to 78) mentally retarded children. Higher IQ (EMR range) children performed better than lower; IQ was highly correlated with success on the Missouri Performance Test. All test items were simple to administer and comprehensible to the children as evidenced by administrator, teacher, and student reaction.

88. CLAWSON, Sam D. "Effectiveness of Four Evaluative Instruments in Assessment of Fundamental Movement Characteristics of a Select Group of Trainable Mentally Retarded Children. *Abstract of Research Papers, 1967 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1967.

This pilot study was designed as part of an effort to develop a single evaluative instrument to use in assessing fundamental movement characteristics of trainable mentally retarded children. Subjects (N=14, 7 boys, 7 girls; CA 6-6 to 19-2; IQ 30 to 47) were evaluated on walking, skipping, jumping, and catching patterns from the Godfrey Movement Pattern Checklist, 11 items of the Purdue Perceptual-Motor Survey, Kraus-Weber Test, and six items in the AAHPER Youth Fitness Test (600-yard run-walk omitted). An analysis of performance on tbese tests led to these conclusions: 1) performances of the mentally retarded children were below what would be expected of normal children on all measures; 2) duplication of basic items was found on the various instruments; 3) each of the four instruments had items not found on the other three; 4) further study and statistical analyses of data could provide a weighted formula for use with these four instruments in assessing fundamental movement characteristics; and, 5) single instruments incorporating items from these four instruments could be developed to use in assessing fundamental movement characteristics.

89. CLEVERDON, Dorothy and Lewis E. Rosenzweig. "A Work-Play Program for the Trainable Mental Deficient." American Journal of Mental Deficiency 60: 56-70; 1955.

The report contains general discussion of a school program for trainable mentally retarded youngsters. It included conclusions drawn by the play school association, a suggested curriculum with appropriate approaches, a list of equipment and supplies, and a suggested daily program. Major focus of the program was on social adaptability. Repetitive experiences constantly connecting concept and experience, rather than rote learning, were stressed.

90. COLE, Clara Jane. *A Study of Physical Fitness and Selected Sports Skills of Normal and Educable Mentally Retarded Girls Enrolled in Levelland Junior High School in Levelland, Texas.* Master's thesis. Denton, Texas: Texas Woman's University, August 1967.

This investigation was intended to determine if eight Junior High School educable mentally retarded girls were similar enough to their 36 normal classmates to benefit from participating in a regular physical education program. Both normal and retarded girls were given the AAHPER Youth Fitness Test and Broer's Sports

Hampshire to gather information about physical education programs for special education students. A personal interview questionnaire was sent to 13 randomly selected physical education teachers to determine content of physical education programs in representative schools and to identify consistencies among existing programs. Important trends gleaned from responses of 148 special educators and 140 physical educators were: 1) all special education students received some form of physical education through the second year of high school; 2) frequency from biweekly to three times per week participation varied; 3) great variations of grade and ability levels were found in the same class; 4) although many school systems did not possess up-to-date guides for regular physical education and only three reported that they had special physical education guides, progressive units built on previously taught skills and lesson plans were reported by all physical education teachers; 5) elementary special education students were usually known to the physical education teacher or the entire special education class reported as a unit to physical education; 6) few school systems had secondary level special education programs and knowledge of students with special physical education needs was poor; 7) few physical education teachers were interested in conferences concerning special education students; 8) all special education students were permitted to participate in interscholastic athletics and some were successful members of varsity teams; 9) special students participated successfully in intramural programs; and, 10) carryover activities were taught in all schools so students could continue them in their hometowns during non-school time and after graduation. Results of the study were submitted to the New Hampshire State Department of Education for information and action.

93. COLLMAN, R. D. and D. Newlyn. "Leisure Activities of Educationally Subnormal and Other Ex-Pupils in England." American Journal of Mental Deficiency, November 1957. pp. 464-469.

This survey was designed to investigate and evaluate leisure activities of ex-pupils from special schools for educationally subnormal and to compare findings with information obtained about ex-pupils from secondary modern schools. Researchers obtained all information by personal interview with subjects or relatives. At the time of interviews a minimum of four years had passed since all subjects had left school. Ex-students from the secondary modern schools (N=100; 50 mentally dull, 24 males, 26 females, IQ $\bar{X}$ 84; 50 normals, 23 males, 27 females, IQ $\bar{X}$ 99) ranged in age from 10 to 21 years when interviewed. Ex-students from special schools (N=90; 55 males, 35 females IQ $\bar{X}$ 61) were between 20 and 26 years when interviewed.

Skills Test for basketball, volleyball, and softball. Important findings included: 1) the total group made significant gains on pull-ups and sit-ups, the four basketball tests, and underhand throw and batting in the softball battery; 2) normal girls performed significantly better on the posttest in shuttle and 600-yard runs and on ball handling in the basketball battery; 3) normal girls performed significantly better than retarded girls on the pretest in the 600-yard run and on the posttest in shuttle run, 50-yard dash, and 600-yard run; 4) on Broer's Sports Skills Tests, the only significant difference occurred on the ball handling test in the basketball battery, where normal girls performed better than the retarded girls; 5) normal girls made significant gains on sit-ups and on four of Broer's Sports Skills Tests--ball handling, wall pass score, and 30-second shooting in basketball, and batting in softball; and, 6) EMR girls did not make significant gains on the Youth Fitness Test and Broer's Sports Skills Tests although slight gains were made on pull-ups, the softball throw, and 600-yard run and on all sports skills test items.

91. COLEMAN, James C., Jack F. Keogh, and John Mansfield. "Motor Performance and Social Adjustment Among Boys Experiencing Serious Learning Difficulties." Research Quarterly 34: 4: 516-517; December 1963.

The purpose of this study was to examine relationship of motor performance to social adjustment among boys experiencing serious learning difficulties. Twenty-two boys (CA 10-1 to 12-10, $\bar{X}$ 11-6; IQ 83 to 117, $\bar{X}$ 102.3) enrolled full-time in the UCLA Psychology Clinic School for remediation of serious learning difficulties were tested. Subjects were given the AAHPER Youth Fitness Test, excluding the 600-yard run-walk. To assess social adjustment the classroom teacher and teacher-supervisor rated each subject on a one to five scale with one being the lowest possible score. Correlation between AAHPER Test and teacher adjustment ratings was .54. Other results support previous findings which demonstrated a strong relationship between performance on the Lincoln-Oseretsky Motor Development Scale and peer acceptance among mentally retarded children.

92. COLLINS, Maurice W. *A Survey of Physical Education Programs for Special Education Students in the Public Schools of New Hampshire.* Master's thesis. College Park, Maryland: University of Maryland, 1972.

Special questionnaires were sent to all special education (N=221) and all physical education (N=262) teachers in New

Information about marital status for each of the three groups was obtained to determine percentage of subjects who were married or engaged. Leisure activities were grouped under sports, hobbies, observational interests, and social activities. Civic responsibility, including political interest and involvement in criminal offenses was considered. The educationally subnormal group was shown to be quite successful in reaching social and civic standards characteristic of their community. The researchers believed that these findings were justification of the English special school system for educationally subnormal students.

94. CONOVER, Darlene Kay. *Object Preference and Resulting Movement Behaviors of Three to Seven Year Old Custodial and Trainable Retarded Boys*. Doctoral dissertation. Columbus, Ohio: Ohio State University, 1973.

The purpose of this study was to determine object preference and movement behaviors evoked by selected objects (ball, blocks, climber, inner tube, and wagon) from 11 three to seven year old custodial and trainable mentally retarded boys. Data were collected from: 1) Study of Object Familiarization to introduce subjects to each object individually to reduce possible familarity/novelty effect; each subject was placed in a room with one object at a time--no teaching or demonstrating was done with an object; each subject was left alone in the room with an object for five minutes during which time his behavior was recorded; 2) Study of Object Preference to determine which object was most preferred when all five objects were presented simultaneously; each subject was placed in the center of the objects and no teaching or demonstrating was done with objects; each subject was left alone in the room with objects for eight minutes during which time his behavior was recorded. Major findings showed that subjects when considered as a group displayed no object preference; however, individual subjects did demonstrate preference for certain objects. Even though such objects evoked movement behaviors, presence of objects in a setting devoid of human contact was not sufficient for the establishment of stimulating and functional environments. No correlations between chronological age and time spent with an object were significant. Significant positive correlations existed between motor age and time spent with the ball and total time spent with all objects combined. A positive significant correlation existed between IQ and time spent with the wagon. Considering all five objects, movement behaviors most exhibited were: resting with the head; manipulating with the hands; holding lifting, and pushing with the arms; walking with the legs; and sitting with the trunk. Of all movements displayed, those occurring for the greatest amount of time were inactive and sedentary in nature.

95. CORDER, W. Owens. *Effect of Physical Education on the Intellectual, Physical, and Social Development of Educable Mentally Retarded Boys.* Education specialists project. Nashville, Tennessee: George Peabody College, 1965. Article, "Effect of Physical Education on the Intellectual, Physical, and Social Development of Educable Mentally Retarded Boys," in Exceptional Children 32: 357-361; 1966.

This study was designed to investigate effects of a planned program of physical education (one hour per day, five days per week for four weeks) on intellectual development, physical development, and social status of educable mentally retarded boys. Subjects (N=24; CA 12-0 to 16-7, IQ 50 to 80) were divided into three groups of eight: 1) training (physical education program); 2) officials (Hawthorne control); and, 3) control (no physical education or special attention). Groups were equated on the basis of CA and IQ. Each boy took AAHPER Youth Fitness Test, Full Scale Weschler Intelligence Scale for Children, and Cowell Personal Distance Scale at beginning and end of four weeks experimental period. Results showed tha the training group scoring significantly higher than both officials and control groups on measures of physical fitness. The training group also scored significantly better than the control group on the measure of intelligence; no significant differences were found between training and official groups on the Weschler Intelligence Scale for Children suggesting that a Hawthorne effect was operative. There were no significant differences among the three groups in social status measures.

96. CORDER, W. Owens. *Effects of Physical Education on the Psycho-Physical Development of Educable Mentally Retarded Girls.* Doctoral dissertation. Charlottesville, Virginia: University of Virginia, June 1969.

The purpose of this study was to ascertain whether an extensive physical training program led to significant improvement in certain physiological and psychological characteristics of mentally retarded girls (N=30; CA 11-9 to 15-9; IQ 50 to 80). Evaluative instruments included Weschler Intelligence Scale for Children (intellectual development), Children's Self-Concept Scale (self-concept), Crampton's Blood Ptosis and Gallagher-Brouha Test for Girls (cardiovascular efficiency) Lange's Standardized Skinfold (skinfold changes), AAHPER Youth Fitness Test (physical fitness), and weight changes. An experimental group (N=15) met five times per week one hour per day, for 30 days to participate in a structured progressive, and systematic physical education program. During this same period a control group (N=15),

closely equated with experimental group, participated in a variety of quiet activities involving little gross movement or motor activity. The experimental group showed significant improvement over the control group in self-concept and showed a greater loss of subcutaneous fat. The experimental group gained significantly over the control group on five of the seven measures of the Youth Fitness Test (sit-ups, shuttle run, 50-yard dash, softball throw, and 600-yard walk-run). No significant changes were recorded in other measures.

97. CORTAZZO, Arnold D. "An Analysis of Activity Programs for Mentally Retarded Adults. Mental Retardation 6:6 December 1968.

This study was undertaken to provide comprehensive information about activity programs for severely mentally retarded adults and to offer recommendations for planning future programs. A nationwide survey was made of all member associations of the National Association for Retarded Citizens identified as sponsoring activity programs for adults. A 72 percent return (68 of 94 centers) was achieved. Subjects (N=1,154: 642 males, 512 females; CA 16 to 62, $\bar{X}$ 24.4; IQ 12 to 60, $\bar{X}$ 42; MA 2 to 8, $\bar{X}$ 5-3) enrolled in programs were referred from public schools (91 percent); public health nurses (71 percent), physicians (62 percent), public rehabilitation agencies (44 percent), institutions (40 percent), mental health after care and child guidance clinics (21 percent), and family agencies (10 percent). Twenty-nine centers had rejected 267 applicants for a variety of reasons. Counseling was provided at 49 centers (72 percent) for retarded persons and their parents. Training activities existed in such broad categories as self-care-grooming, useful home skills, academics, recreation, community skills, communication, paid work, and crafts. Specific recreation (N=38) activities reported were dances, parties (N=31), basketball (N=27), swimming (N=26), excursion trips (N=25), spectator sports (N=21), hikes (N=12), day camping (N=12), physical education (N=12), residential camping (N=8), and craft activities including paper craft (N=27), woodworking (N=18), weaving (N=15), metal craft (N=13), leather craft (N=12), and ceramics (N=1). While numerous objectives were reported, the majority of centers had goals in the area of mental health (88 percent), training in daily living activities other than work (78 percent), and relief for parents (60 percent); fewer than half (40 percent) listed recreation as one of their objectives. All centers considered training individuals capable of developing work skills for eventual placement in workshop activities as a major objective. In many respects, objectives of these activity programs were similar to those of public schools for trainable mentally retarded children.

Specific recommendations included improving areas of noted weaknesses (evaluation and referral practices, admission criteria, and activities); developing staffing patterns and program materials (guides and training materials), enriching in-service programs, and operating with minimum operating standards.

98. CORTAZZO, Arnold D. "Increasing Sociability for the Retarded Through Activity Programs." Journal of Rehabilitation 30:2: 13-14; March/April 1964.

Opportunities to participate in activity programs enhance the personal and social development of mentally retarded persons considered too handicapped to be included in sheltered workshop programs. Activity programs give these persons opportunities to work with those who are similarly handicapped and to adjust to activities in daily living. These programs serve three basic purposes: 1) act as a buffer against any increase in social isolation and devaluation; 2) strengthen an individual's self-concept and personality; and, 3) enable an individual to develop positive relationships with peers, family, and other adults in the community.

The author illustrates these points by explaining details of a volunteer health program in Akron, Ohio, where an occupational therapist and physical therapist trained volunteers to participate in the health program. Volunteers took a training course and agreed to provide the agency with a minimum of 100 hours of volunteer service. The training course proved so effective that, upon completion, volunteers were ready to work with patients. In the author's view, the Akron program proved that the right volunteers given appropriate training and supervision could be of valuable aid in providing physical and occupational therapy for chronic disease patients often forgotten by the community and confined to their homes.

99. CORTAZZO, Arnold D. and A. R. Menefre. "Exploring a Need: A Survey of Recreation in Institutions for the Mentally Retarded." Recreation 57: 304-305; June 1964.

The researchers surveyed 111 institutions for mentally retarded persons in the United States to gather information about available recreation program. They learned how many institutions offered recreation programs and types of activities available. They also gathered data about training of personnel in charge of various programs. Results pointed out the need to expand programs for severely retarded residents and for an overall evaluation of recreation programs. The survey also indicated a substantial shortage of full-time recreation personnel trained to work with retarded persons in residential facilities.

100. COURTNEY, G. Louise. *Effects of a Program of Physical Activities on the Balance of Elementary Educable Mentally Retarded Children.* Master's thesis. University Park: Pennsylvania State University, 1972.

Two groups of educable mentally retarded boys and girls (ontrol, N=9; experimental, N=12) participated in two 30 minute physical education periods each week. The program was the same for both groups except the experimental group took part in special activities designed to develop balance. Balance Stick, Leaping Footprint, Springfield Beam Walking, and Dodging Run Tests were given to both groups prior to the fall-winter indoor and spring-outdoor seasons, and at the end of the school year. Results on pre and posttests revealed no significant differences between mean scores of control and experimental groups on any of the test items. Mean performances of the experimental group improved significantly on the Springfield Beam Walking and Leaping Footprint Tests, while the control group showed significant improvement on the Leaping Footprint and Dodging Run Tests. Neither group demonstrated significant improvement in static balance as measured by the Balance Stick Test.

101. CRAIG, Timothy T. *Operative Time Estimation in Educable Mentally Handicapped Subjects.* Master's thesis. Champaign-Urbana, Illinois: University of Illinois, 1968.

Purpose of this study was to assess ability of three groups of subjects to estimate a given time lapse. Groups consisted of: 1) educable mentally handicapped children from a special education class (N=17); 2) mental age normals (N=17); and, 3) chronological age normals (N=17). The test used was an estimate of two seconds by moving a cursor along a trackway. No significant differences in learning or performance among groups were found.

102. CRATTY, Bryant J. "On the Threshold." *Paper delivered at Texas Institute of Child Psychiatry, Baylor University Medical Center, Houston, Texas, December 1965.* Los Angeles, California: the Author, University of California (Department of Physical Education).

This is a comprehensive review of some problems concerned with motor learning. The author raised these questions: 1) does one merely have an obligation to outline techniques for perceptual-motor training without providing a scientifically sound theory underlying these techniques? It is important to know why one is doing something which seems to improve learning in the classroom 2) What is the status of knowledge about the human nervous system,

learning, motor activity, and interaction between classroom learning and movement activities? 3) What kinds of perceptual-motor training programs may enhance learning and which activities seem superfluous?

The author outlined four major, identifiable factors: 1) functioning of the nervous system is not as simple as assumed by theory--voluntary motor patterns are the product of dynamic interactions of innumerable areas of the brain, some initiating, others suppressing, and other timing actions; 2) a scarcity of data supporting assumptions that motor activity of large postural and limb muscles affect visual or associative centers of the brain exists; 3) observational data advanced in support of these theoretical suppositions have been gained by clinicians watching gross behavior of children, and then explaining observations by gypothesizing neurological underpinnings; 4) much is based upon the importance of establishing laterality for the purpose of improving complex symbolic behavior and abstract reasoning.

The author concluded by enumerating some findings which might serve as guidelines to future action: 1) motor attributes of children are highly specific and tend to become more so with age and experience; 2) perceptual judgments and motor functioning are at times impossible to separate; 3) muscular tension facilitates direct forceful acts, while inhibiting complex coordinations; 4) complex tasks many times can be learned by children with severe perceptual-motor problems if the skills are reduced to simple components and the child is reinforced; 5) the manner in which a child perceives, moves, locates, and uses his body parts influences learning during early childhood; and, 6) often more important than performance level in a task is how an individual feels about his level of achievement.

103. CRATTY, Bryant J. "The Perceptual-Motor Attributes of Mentally Retarded Children and Youth." Los Angeles, California: Mental Retardation Services Board, August 1966.

A battery of tests was devised to evaluate six perceptual motor attributes of mentally retarded youth: body perception, gross agility, balance, locomotor agility, throwing behavior, and ability to track balls. The test battery was designed to be administered in period of 20 to 30 minutes with a minimum of equipment by individuals who could be trained in about two hours.

In the first phase of the project, 83 children were tested to determine reliabilities of tests (r's=.75 to .84) and of the total battery (r=.92). During the second phase of the

project, 116 additional children were tested. Scores of 93 of these subjects were combined with those initially tested (total N=176; CA 5 to 24 years, $\bar{X}$ 11.40)to draw conclusions relative to intergroup differences, to arrive at implications for educational programs for mentally retarded children and to formulate norms for perceptual-motor abilities of trainable and educable mentally retarded children, for children with Down's Syndrome, and for educationally handicapped youngsters.

Major findings included: 1) age and IQ were moderately correlated with scores in the total battery (.54 and .63 respectively); 2) mean scores for all tests taken by EMR and EH children were significantly superior to scores achieved by TMR subjects; 3) most inferior were children with Down's Syndrome, especially in tests of balance; 4) higher interest correlations were noted when scores of TMR youngsters were contrasted than when similar measures of EMR subjects were compared; 5) over 90 percent of TMR and EMR children showed appropriate cross extension patterns when crawling and walking; 6) developmentally EMR and EH subjects had their best performances during late childhood and early adolescence, with some deterioration noted in performance means in late adolescence and early adulthood; 7) mongoloid children evidenced gradual improvement with age in tests evaluating body perception, agility, and tracking, with no significant improvement noted in balance, locomotor agility, and throwing; and, 8) all groups had difficulty in correctly distinguishing left and right body parts.

104. CREEKMORE, Walter. *The Effect of a Diagnostically Designed Recreation Program on Performance in Selected Areas of Functioning of Mentally Retarded Persons in an Institutional Setting.* Master's thesis. Tallahassee, Florida: Florida State University, 1969.

Purpose of this study was to determine effects of a diagnostically designed recreation program on performances in selected areas of mentally retarded persons in an institutional setting. Moderately retarded boys (N=18; CA 13) were pretested with the Florida State University Diagnostic Battery of Recreative Functioning for trainable mentally retarded. Battery pretest scores were used to determine recreative functioning strengths and weaknesses of each boy. Subjects were placed in three groups according to battery scores, physical handicaps, and physical sizes. Control Group II was composed of six subjects who participated in a traditional recreation program with 44 other residents; leadership ratio in this group was one to 50. Control Group I consisted of six subjects who participated in a traditional recreation program with a leadership ratio of one to three. The experimental group consisted of

six subjects with two leaders who provided a diagnostically designed recreation program for eight weeks. The battery was administered as the posttest. Results indicated that the lower the leader-to-participant ratio, the more effective a traditional recreation program was in raising scores on 11 of 481 subsections. The experimental group scored significantly higher than control groups on six subsections on the posttest.

105. CRUSE, Daniel B. "Effects of Distraction Upon the Performance Of Brain Injured and Familial Retarded Children." American Journal of Mental Deficiency 66: 1: 86-92, 1961.

Twenty-four brain injured and twenty-four familial retarded children were used as subjects to evaluate effects of distraction upon reaction time responses to a light stimulus. Distraction variables included sound and visual stimuli such as tones, balloons, and toys. Brain injured subjects with definite signs of organic injury were found to be more distractable than familial subjects. It was also noted that both groups benefitted from minimizing environmental distractions.

106. DAVIS, Ruth Meredith. *The Relations Between Body Image Boundary and Physical Fitness in Children from a Trainable Program for Mental Retardates.* Doctoral dissertation. Columbus, Ohio: Ohio State University, 1970.

This study was designed to explore relations between body image boundary and physical fitness in mentally retarded subjects (N=33, 21 male, 12 female, IQ 30 to 78; CA 12 to 20) attending a public day school with a program for trainable mentally retarded persons. The Holtzman Inkblot Test, scored for barrier and penetration, was used to assess body image boundary; the AAHPER-Kennedy Foundation Special Fitness Test was used to evaluate physical fitness status. Chronological age, IQ, and mental age were obtained from school records. Results showed: 1) significant relationships between barrier score and fitness measures with both male and female groups for which shuttle run and sit-ups were significantly related items; penetration score was significantly related to all fitness tests for male subjects; 2) male subjects were in general superior to females in performance of fitness tasks; barrier score was higher for female subjects and their penetration scores lower; 3) mean scores of subjects in terms of body image boundary were similar to nonretarded subjects of similar chronological age. Using barrier score as a predictor of socialization, subjects appeared to be capable of fairly normal social adjustment within their own group

The nature of significant relationships seemed to indicate that subjects with only mediocre physical fitness scores evidenced greatest potential for social adjustment as measured by barrier score. The number and extent of relationships were not sufficient to be conclusive; the study did not support the supposition that a higher level of physical fitness contributed to social adjustment of retarded males and females.

107. DIAMOND, Eugene F. and Myong Sun Moon. "Neuromuscular Development in Mongoloid Children." American Journal of Mental Deficiency 66: 218-221; 1962.

Various forms of therapy designed to improve neuromuscular performances of mongoloid children were tried in this study. Observations one year after therapy revealed no undesirable side effects of treatment. There was no change in intelligence or general appearance of any group and none of the therapy groups showed improved neuromuscular development when compared with controls.

108. DINSMORE, Mayme. "Teaching Specialized Subjects to the Mentally Defective." American Journal of Mental Deficiency 57: 50-55; 1952.

This study describes music, art, and physical education programs at the Pacific Colony Hospital, California. The physical education program consists of games, dancing, and other informal activities, rather than drills and calisthenics. Two of the outstanding features of physical education are its informal atmosphere and the fact that it is noncompetitive. It was noted that physical education is an integral part of the total curriculum which contributes to mental and physical well being of mentally retarded participants.

109. DISTENFANO, Michael K., Norman R. Ellis, and William Sloan. "Motor Proficiency in Mental Defectives." Perceptual and Motor Skills 8: 231-234; 1958.

The purpose of this study was to investigate relationships between intelligence (Stanford Binet) and motor proficiency (Lincoln-Oseretsky Motor Development Scale, Rail-walking Test, Placing and Turning Minnesota Tests, Rate of Manipulation Test, Hand Steadiness Test, Hand Dynamometer Test) of 76 institutionalized mentally defective subjects (males N=40, CA 9-7 to 29-0, $\bar{X}$ 19-8; MA 5-4 to 11-6 $\bar{X}$ 9 to 11; females N=36, CA 11-6 to 32-5, $\bar{X}$ 22-3; MA 5-6 to 10-9, $\bar{X}$ 9-2). Results showed: 1) no significant differences between performances of Caucasian and Negro subjects, 2) males more proficient than females on

all tests with only differences in rail-walking significant, 3) Lincoln-Oseretsky and Minnesota placing and turning performances highly related to mental age, 4) Lincoln-Oseretsky having highest correlation with mental age, 5) no significant relationship between chronological age and motor scores although several tasks were significantly correlated with mental age.

110. DOMAN, Robert J., Carl H. Delacato, and Glen Doman. "Children with Severe Brain Injuries: Neurological Organization in Terms of Mobility." Journal of the American Medical Association 174: 3: 257-262; September 1960.

This study describes a recently devised approach used in treating brain-injured children. Subjects (N=76 brain-injured children) none of whom could walk, were required to remain in various prone positions all day. At the termination of two years and after many tests, findings were evaluated from four points of view: 1) global results; 2) results relating to chronological age; 3) results with respect to functional levels at the onset of the program; and, 4) results concerning individual disposition of each patient. Significant improvement was found when results obtained by using this procedure were compared with those obtained when classical procedures were used.

111. DOORN, Carol H. *Motor Proficiency of Mentally Retarded Children.* Master's thesis. Brookings, South Dakota: South Dakota State University, 1966.

The Oseretsky Tests of motor proficiency were given to six boys and a girl (IQ's below 70) before and after they participated in a remedial physical education program. Results showed significant improvement; correlations between motor ability and IQ were substantial. These mentally retarded children tended to function physically at their mental age.

112. DROWATZKY, John N. "Effects of Massed and Distributed Practice Schedules Upon the Acquisition of Pursuit Rotor Tracking by Normal and Mentally Retarded Subjects." *Abstract of Research Papers, 1969 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1969.

Purpose of this study was to compare effects of massed and distributed practice schedules on pursuit rotor tracking by normal (N=30) and mentally retarded (N=29) subjects. Each child was assigned randomly to a group where one of three practice conditions was used: 1) massed practice with no rest between trials, 2) distributed practice with 20-second rest between

trials, and, 3) two-minute rest between trials. Each subject had the equivalent of 20 practice bouts, each lasting 20-seconds, followed by five minutes of rest and then 10 more practice bouts on a photoelectric pursuit rotor. Findings reflected significant differences in performances of normal and retarded groups and between subjects participating under different practice conditions. Results also showed that inhibition influenced normal and mentally retarded subjects in different ways, and different kinds of inhibition affected performances of normal subjects with length of rest periods a key factor.

113. DROWATZKY, John N. "Physical Education for the Brain-Injured Child." The Physical Educator 22: 2: 76-77; May 1965.

Concepts that should be stressed and activities that should be taught in physical education programs for brain-damaged children who have faculty judgment, are extremely rigid to change, and lack ability to understand and/or use words or symbols to express ideas are discussed. A physical education program must provide opportunities for instruction in a variety of activities--physical fitness, basic skills, sports, games, and recreational. Programs just be founded on two basic principles: 1) skills must be taught in their simplest forms by providing experiences which emphasize basic concepts; and, 2) organized and integrated experiences should provide continual and gradual change to new activities.

114. DUBIN, Harry N. "A Report on Some Current Developments in a Local Community in Building a Recreation Program for Severely Retarded Children." American Journal of Mental Deficiency 60: 2: 291-296; October 1955.

This study describes a training program of four saturday meetings to help recruit volunteers (N=228 school teachers, supervisors of recreation departments, parents of retarded children) and to inform them about need to provide recreational opportunities for mentally retarded persons. Programs of the Pennsylvania Association for Retarded Children were included in many ways by these training sessions: 1) five centers for cerebral palsied, crippled, and retarded children and victims of muscular dystrophy were developed throughout Philadelphia with parents' clubs helping in various recreational activities, and 2) a volunteer leader's handbook was developed to define recreation for handicapped persons, suggest program objectives, show needs for volunteers, outline requirements for volunteers, and list 15 do's for working with mentally retarded persons. Program evaluation showed: 1) the general public had become more aware of problems of mental retardation, 2) public agencies and

civic groups had accepted recreation programs for retarded groups, 3) special needs and problems of retarded children and adults had to be recognized and receive adequate treatment, and, 4) parents had become aware of needs of retarded children and adults and recognized the variety of programs that could meet these needs.

115. DUBIN, Harry N. "Some Observations on the Place of Physical Education and A Health Program in Building A Program for the Mentally Retarded Child." American Journal of Mental Deficiency 59: 6-12; July 1954.

The author describes his observations of physical education and music programs taught at a Pennsylvania Association for Retarded Children school in Philadelphia. He concluded that teachers were best able to communicate with mentally retarded children in terms of involving games and related activities which served as a core for learning at the school. He felt that learning and developing social competencies could best take place around a concrete core of experiences rather than through teaching formal academic subject matter such as social studies.

116. DUPONT, Annalise, K. R. Heeboll-Nielsen and Britta Holle. "Moron (Debile) Children: Physical Treatment, Training, and Education." *Proceedings London Conference on the Scientific Study of Mental Deficiency, 1962.* Brejning, Denmark: Kellerske Institution.

This study investigated relationships between mentally defective and normal pupils in these areas: height to weight, age to height, physical functioning, IQ to height and muscle strength, hand strength and Height to IQ, bone growth, and posture. A clinical examination was given to 180 debile pupils attending a boarding school. Fifteen girls and 11 boys were selected because of their poor posture and since some mentally defective persons often exhibit postural defects which can be treated by physiotherapy. Since it is desirable that retarded individuals look normal, it is important that they be trained to walk and move properly. For this reason physiotherapists must be a part of the instructional team so training and treatment are part of the common therapy. Since many children of this group are often deficient in muscular strength, they should not be placed in situations requiring hard work.

117. EBER, Carol Josette. *The Effects of a Trampoline Training Program On Balance of Educable Mentally Retarded Children Aged Fourteen to Sixteen Years.* Doctoral dissertation. Greeley, Colorado: University of Northern Colorado, 1971.

This study was designed to determine effects a trampoline training program had on static and dynamic balance of educable

mentally retarded boys and girls. The population (N=42) was divided into experimental (N=23, CA $\bar{X}$ 15-5; IQ $\bar{X}$ 65) and control groups (N=19, CA $\bar{X}$ 15-9; IQ $\bar{X}$ 67). Tests from the Lincoln-Oseretsky Motor Development Scale, of static balance included standing on one foot with eyes closed, standing on one foot with eyes open, and standing heel-toe with eyes closed; tests of dynamic balance involved walking eight feet long and four inch and two inch balance beams. The two groups were pre and posttested and each experienced a training program for 30-minutes a day, five days a week for six weeks. The control group was given a physical education program consisting of volleyball, bowling, softball, basketball, social dance, and physical activities; the experimental group was given sequential trampoline training. Posttest results indicated that experimental and control groups both improved significantly on static balance; no significant changes were obtained for dynamic balance. No other comparisons produced statistically significant differences except for static balance test of standing on one foot with both eyes open; this singular test was significant for both groups. Results showed that both trampoline training and regular physical education activity programs were effective in improving static balance of educable mentally retarded children, aged 14-16 years; results also indicated that neither program improved dynamic balance tasks significantly during limited time of the study.

118. EDWARDS, Nancy F. *A Statistical Analysis of the "Mundy Recreation Inventory for the Trainable Mentally Retarded."* Master's thesis. Tallahassee, Florida: Florida State University, 1968.

This study was a statistical analysis of the Mundy Recreation Inventory for the Trainable Mentally Retarded. Correlations were computed between chronological age, subtest scores, and total scores, and among all subtest scores; institutionalized and noninstitutionalized segments of the sample were compared on these variables. Performances of subjects on this inventory did not appear to be affected by chronological age; even though some overlap was observed between subtests, they appeared to measure different factors. No significant differences were found between the two segments of the study sample. Forty-four of 95 inventory items appeared to discriminate well.

119. EGGERS, Sharon Joan. *A Comparative Study of Motor Ability Skills Between Educable Mentally Retarded Children and Normal Children.* Master's thesis. Knoxville, Tennessee: University of Tennessee, August 1967.

This study compared select groups of educable mentally retarded children (N=35; CA 9 to 12) with normal subjects (N=30;

CA 9 to 12) to determine differences in their motor ability. Selected items from Oseretsky Test of Motor Performance and Purdue Perceptual-Motor Survey were used to compare motor performances of the two groups. In 12 of 17 test items, performance of normal subjects were significantly superior to performances of retarded subjects. However, the investigator felt that differences in physical education facilities, economic status, and home environments of subjects could have influenced results.

120. EHRENBURG, Lois Hildah. *The Benefit to Educable Mentally Retarded Girls by Participation in a Physical Education Program.* Master's thesis. Fresno, California: Fresno State College, June 1963.

This study was designed to determine whether educable mentally retarded girls (N=15; IQ 57 to 79, $\bar{X}$ 66.7; CA 13-2 to 17-0) benefited from participating in a special physical education program. for one semester. Scores on sit-ups, push-ups, 50-yard dash, and standing broad jump were compared with Fresno City Scale and California Percentile Scores; a special questionnaire was completed by each girl relating to their interest in and enjoyment derived from participating in physical education. Conclusions included: 1) EMR girls benefited from participating in the physical education program as shown by progress on designated test items, 2) these girls performed better on strength and endurance items that on those requiring complex motor skill, 3) EMR girls scored better on the California Percentile Scores than on the Fresno City Scales, 4) they performed more like a typical group than EMR as described in the literature, 5) generally, they followed patterns of nonretarded girls, 6) although girls who scored high on one of the four test items were likely to score high on all of them, these performances were not necessarily related to IQ, 7) when the girls did not standout as misfits, they were more likely to enter into activities willingly and sufficiently to improve levels of overall fitness, 8) regular physical education classes did not appear to motivate the EMR girls or provide instruction to enable them to bring performance to normal levels. Most of the girls (N=12) liked the special class and all but one felt it was good for her. Physical education was preferred over English and social studies, while math, science, and homemaking were preferred over physical education.

121. EICHENBAUM, B. and N. Bednarek. "Square Dancing and Social Adjustment." Mental Retardation 2: 2: 105-109; April 1964.

Two classes of mentally retarded children (CA 7 to 16) participated in a square dance program designed to alleviate

problems caused by extreme hostile and aggressive behavior. The children, all of whom were classified as educationally retarded, emotionally disturbed, or brain-injured participated in the dance program in the hope that it would relieve tensions provide an outlet for physical energy, and prove enjoyable. The program had positive results: 1) aggressive children became more socially acceptable, 2) educationally incapable children became more able to accept mistakes, 3) other marked improvements in over-all attitudes were noticed, and, 4) children felt this was their activity as they gained personal satisfaction of being able to participate in recreational activities as well or better than their nonretarded peers.

122. ELBERTY, Harry. *Acquisition of Skill in Flight Balance Related Tasks Between Educable Mentally Retarded and Normals Through the Individually Prescribed Instructional System.* Master's thesis. Slippery Rock, Pennsylvania: Slippery Rock State College, 1971.

Ten educable mentally retarded children and ten normal children were matched on initial entry placement levels in a sequentially structured program of flight balance tasks. Individual prescriptions were written so that each student could move at his own pace through a self-instructional self-evaluative program. No significant differences were found in rates of learning between mentally retarded and normal children although students in each group entered the program at different levels and progressed at different rates.

123. ELKIN, Edwin H. and Erwin Friedman. *Development of Basic Motor Abilities Test for Retardates: A Feasibility Study, Final Report, AIR-AOR-86-2/67-FR.* Jewish Foundation for Retarded Children, now National Children's Center (6200 Second Street, N.W., Washington, D.C.) and American Institute for Research (8555 16th Street, Silver Spring, Maryland), February 1967.

This report presents results of a feasibility study which attempted to modify existing tests by simplfying instructions and equipment to assess motor abilities of mentally retarded persons. Specifically this pilot study attempted to: 1) adapt for use with mentally retarded populations several psychomotor and physical proficiency tests (psychomotor and Fleishman's Basic Fitness Tests) available in the American Institute for Research's (AIR) Human Skills Research Laboratory, 2) select a sample of the Jewish Foundation for Retarded Children population (N=41, male 30, female 11; CA 6 to 25, $\bar{X}$ 13; IQ 18 to 16, $\bar{X}$ 43; 18 residents, 23 day care) to test, 3) use modified AIR Tests to measure performances of the selected population,

4) develop prototype ability profiles on individual subjects, 5) evaluate goodness of performance tests for use with mentally retarded persons, and, 6) assemble basic information on each subject to explore relationships among performance measures and age, sex, IQ, classification, and major impairment symptoms. Analyses indicated that: 1) ability measures might be useful for differentially assigning mentally retarded persons to training programs as functions of skills for which their abilities are similar, 2) motor abilities of mentally retarded persons might be assessed by modifying existing tests of basic motor abilities and administering them to such populations, and, 3) ability tests might serve as indicies of development of retarded persons and might eventually provide the basis for assigning them to skill training programs specifically geared to their underlying abilities.

124. ELLIS, Norman R., editor. *Handbook of Mental Deficiency.* New York, New York: McGraw Hill, 1963.

Seven recent studies of mentally defective subjects were analyzed to determine if relationships existed between motor ability and mental deficiency. It was found that children enrolled in public school classes tended to score higher on tests measuring motor proficiency than youngsters of similar age, sex, and IQ range living in institutions. One study showed that moderately retarded children who did not attain as high a level of motor proficiency as normal children were able to improve their comparatively lower motor skills. The researchers concluded that since mentally defective subjects tended to demonstrate more defects than normal children in sensorium, neuromusculature, and in other organic structures and functions, it was not surprising that they exhibited more motor disabilities.

125. ELLIS, Norman R. and M. K. Distefano. "The Effects of Verbal Urging and Praise Upon Rotary Pursuit Performances in Mental Defectives." American Journal of Mental Deficiency 64: 486-490; 1959.

This investigation was designed to study effects of verbal urging and praise upon rotary pursuit performances of mentally defective subjects. Male and female mentally defective subjects (N=28) were matched on the basis of a previous pursuit motor performance, Binet IQ, age and sex. Results confirmed that verbally urged and praised subjects did significantly better than those in the control group.

126. ELLIS, Norman R. and Ronald S. Pryer. "Quantification of Gross Bodily Activity in Children with Severe Neuropathology."

American Journal of Mental Deficiency, May 1959. pp. 1034-1037.

In this investigation the researchers attempted to quantify gross bodily activity in a naturatistic situation which permitted locomotion. Subjects (N=29; CA 3-10 to 13-6; IQ $\bar{X}$ 17) were brought individually into an enclosed test room in which the photronic principle was used to quantify movement; beams of light were criss-crossed at two-foot intervals in the room. Movement by a child, while playing with tops interrupted a beam which closed a circuit containing an impulse counter; light beams were visible to the children. Each child was placed in the room for one 20 minute period each day for eight days. Raw score measures of activity ranged from three to 1,576 and were positively skewed. There appeared to be a clear trend in mean scores, possibly indicating a gradual reduction in activity level as subjects adapted to the apparatus. In correlating for ten and 20 minute intervals, it was found that scores were higher for the entire 20 minutes than for the first ten minutes.

127. ELLIS, Norman R. and William Sloan. "Relationship Between Intelligence and Simple Reaction Time in Mental Defectives." Perceptual and Motor Skills 7: 65-67; 1957.

After administering an intelligence test the researchers gave mentally deficient children a reaction time test utilizing a telegraph key. After 12 trials, results indicated a moderate, inverse rectilinear relationship between mental age and reaction time. This highly significant relationship was almost entirely independent of the small regression in reaction time upon chronological age. When compared to normal subjects tested under slightly different conditions, it appeared that mentally deficient children reacted much more slowly.

128. ELLIS, Norman R. and William Sloan. "Rotary Pursuit Performance as a Function of Mental Age." Perceptual and Motor Skills 7: 267-270; 1957.

The purpose of the study was to determine relationships between rotary pursuit performances and mental ages of mentally retarded institutionalized patients (N=88; CA 9-3 to 50-3). Subjects were divided into three groups on the basis of Stanford Binet mental age: 1) 2-4 to 4-9; 2) 5-1 to 7-8; and, 3) 9-0 to 10-8. Patients were given 20 trials of 20-seconds duration with 20-second intertrial rest periods on a pursuitmeter with electric timer. Scores were computed on the basis of total times on target per trial. Performance curves

showed that groups two and three made steady improvements in proficiency with practice. Mean times on target were 3.4, 10.5 and 13.3 seconds respectively.

129. ELLIS, Norman R., Charles D. Barnett, and Margaret W. Pryer. "Performance of Mental Defectives on the Mirror Drawing Task." Perceptual and Motor Skills 7: 271-274; 1957.

Purpose of this study was to show effects of mental age on perceptual-motor learning of institutionalized mentally defective persons. Subjects (N=70; males 117, females 53) were assigned to three groups on the basis of Stanford Binet Mental Ages. The task was to trace a five pointed, double-lined star while observing hand movements in a mirror; each subject had ten massed trails. Findings revealed that performance levels differed for each mental age group. An inverse relationship between mental age and total error was observed (r= -.27); no relationship was found between mental age and time required to complete the first trial.

130. ELLIS, Norman R. Margaret W. Pryer, and Charles D. Barnett. "Motor Learning and Retention in Normals and Defectives." Perceptual and Motor Skills 10: 83-91; 1960.

This study was designed to compare motor retention of normal and mentally defective subjects through analyses of motor skill acquisition, warm-up, and reminiscence. Normal subjects demonstrated better retention performance and larger warm-up effects as measured on activities involving the pursuit roter.

131. ELLIS, Norman R., Margaret W. Pryer, M. K. Distefano, and Ronald S. Pryer. "Learning in Mentally Defective, Normal, and Superior Subjects." American Journal of Mental Deficiency 64: 725-734; 1960.

The intelligence (Stanford-Binet, Terman-McNemar Test of Mental Ability) of mentally defective, normal, and superior subjects were compared on serial verbal and maze learning tests. The test for serial verbal learning involved anticipating ten nouns on a memory drum; the maze test involved choosing direction to turn when entering an intersection of a maze. Each subject continued until he had nine successful attempts in ten efforts. On the serial verbal test, successes were highly related to intelligence level. On the maze test, subjects with sub-normal IQ's required more than twice as many trials as those higher IQ levels.

132. ERKAN, Necmettin. *The Value of Physical Education for Mentally Retarded Children.* Master's thesis. Downer's Grove, Illinois:

George Williams College, June 1966.

This study investigated effects of participating in an intensive physical education program on mentally development of institutionalized mildly and moderately mentally retarded boys. Experimental (N=21) and control (N=21) groups were matched on the basis of mental and chronological ages and social quotient (Vineland Social Maturity Scale). The experimental group participated in a special physical education program ten hours per week for two months. Activities included morning gymnastics and indoor games (30 minutes per day), gymnastics and tumbling (six hours per week), basketball and soccer (four hours per week), trampoline and balance activities, and swimming and diving (45 minutes per day). Results showed that social quotients of the experimental group increased significantly over that of the control group. However, social ages did not reflect significant differences despite favorable gains in the experimental group. Additional analyses of the experimental group showed significant gains in a variety of physical (blood pressure, pulse rate, chest expansion), strength (grip, push, total pulling) and skill (Sargent Jump) measures.

133. FAIT, Hollis. "Physical Fitness Tests for the Mentally Retarded." The Bulletin 2: 1: October 1965. New Haven, Connecticut: Connecticut Association for Health, Physical Education and Recreation (Southern Connecticut State College).

Often physical fitness scores of mentally retarded youngsters have been adversely influenced by their inability to comprehend what is expected of them on tests designed for children with normal intelligence. To counteract this, a test battery (bent arm hang or straight arm hang, three or five chair zig-zag run, leg lift, static balance test, 35-yard run, 140-yard run) was designed to assess levels of physical fitness of mentally retarded individuals. Items from tests given normal children were adapted and simplified considerably. Although most of the original test items were highly related to IQ none of the adapted test items were so related. Original and adapted test items were also given to normal youngsters; a high correlation was found between related items from original and adapted tests indicating that adapted test items were measuring the same fitness factors as original test items. Adapted test items were given to 200 educable and trainable residents of Mansfield State Training School and Hospital and were found to be accurate in assessing physical fitness levels of these subjects.

134. FAIT, Hollis F. and Harriet J. Kupferer. "A Study of Two Motor Achievement Tests and Its Implications in Planning

Physical Education Activities for the Mentally Retarded." American Journal of Mental Deficiency 60: 729-732; 1956.

Performances of institutionalized mentally retarded adolescent males (N=41) were compared with standard norms for two motor tasks requiring different degrees of insight and ability (vertical jump and Burpee or squat thrust). Results of the vertical jump (T score 47.68) were favorable when compared to those of a normal secondary school population; Burpee results (T score 23.90) were significantly lower than results of the normal population. During the Burpee subjects showed signs of stress and uneasiness not evident during the vertical jump. Differences were felt to be influenced more by complexity of movements (intellectual loading) of the Burpee than to basic differences in motor ability. Activit based on previous movements caused frustration and d minished chances of success by these subjects.

135. FARRILL, Larche. *A Proposed Physical Education Program for Elementary School Age Mentally Retarded Children.* Research paper. Warrensburg, Missouri: Central Missouri State College, 1966.

This study was designed to obtain information for planning a physical education program for educable mentally retarded students in an elementary school. Eighty-seven letters were sent and 71 responses (82 percent) received; 60 returns contained information about programs for mentally retarded students; 11 respondents indicated they had no information or experience in planning or conducting physical education programs for mentally retarded children. Recommendations included kinds of physical education activities (individual games or games of low organization, athletic or team games, rhythmical activities, stunts and tumbling, self-testing); percentage of time for each type of activity, and listed individual activities within each category.

136. FENN, James D. "A Visually Steered Gross Motor Development Program." The Cerebral Palsy Journal 26: 5: 3-8; September/October 1965.

In this investigation, an underlying philosophy behind a visually steered gross motor training program was introduced. Rationale was based on the principle that vision was not eyesight alone and not solely achieved in 20-20 sight. The basic aim of this program was to make specific fundamental exploratory activities and movements part of each child's responses to various stimuli and cues. Subjects (N=10; CA

5 to 8, $\bar{X}$ 6-6; IQ 38 to 116, $\bar{X}$ 78.6) included seven children with cerebral palsy and three youngsters with demonstrable symptoms of brain injury. The program included a variety of activities and equipment: tumbling, trampolining, moving on walking rails, balancing on boards, writing on chalkboards with oversized chalk, hitting balls swinging from strings, using plastic ball, and working with geometric forms. Large muscle group movements instilled an awareness of body parts, including how to use them and where they were located. Progressions were devised so that as children completed one exercise the next one required slightly more complex movements or patterns. Results showed that some of the youngsters became able to make a bow or tie their shoes; some children became more adept at buttoning clothes and dressing themselves. In general, children became better learners; parental attitudes changed positively.

137. FIELDS, Ruby D. "Physical Abilities of the Mentally Retarded Child." Journal of American Physical Therapy Association 49: 1: 38-46; January 1969.

This study was designed to evaluate gross motor abilities of mentally retarded boys and girls. Subjects (N=100; CA 5 to 10 $\bar{X}$ 7-6) were tested by a physical therapist who evaluated head and trunk control, sitting balance, creeping, locomotion in an upright position, stair climbing, hopping, and skipping using items selected from several different tests. Based on test results each child's motor age was computed by finding the level below which he had no failures and adding to those he performed above that level; motor quotient was determined by dividing motor age by chronological age. Gross motor abilities of these subjects were about half of what could be expected of normal children--CA $\bar{X}$ 7-6; motor age 3-8; motor quotient 51. As children increased chronologically, motor quotients decreased and the gap between them and their peers increased. There was a gradual rise of mean motor ages through the eight-year old subjects, a marked increase in motor ability among nine-year olds, and a rather sharp decline among ten-year olds. Although twice as old chronologically as five-year olds, ten-year old subjects had a mean motor age only 10.25 months higher than five-year olds; the motor quotient for ten-year olds was nearly 20 points below that of five-year olds.

138. FINKS, Terry R. *Participation by Educable Mentally Retarded Males in Secondary Interscholastic Athletics.* Master of Education research paper. Columbia, Missouri: University of Missouri, April 1972.

This study had two expressed purposes: 1) to get a realistic picture of participation by educable mentally retarded boys in

grades 9 to 12 in interscholastic athletics, and 2) to study recommendations made by authorities concerning EMR males participating in interscholastic athletics in grades 9 to 12. Questionnaires were sent to 38 special education directors in Missouri schools and to ten randomly selected individuals considered authorities in the field of mental retardation. Analysis of results showed that 50 boys from 27 schools participated in interscholastic sports including football, basketball, track, baseball, wrestling, and cross-country; several lettered, a few made all conference teams, and one gained all state honors. Problems in and benefits of participation were realistically and honestly delineated with overwhelming endorsement given to encouraging EMR boys to participate in a variety of interscholastic athletic activities. General conclusions were: 1) benefits outweighed special problems, 2) opportunities for participating in interscholastic activities were limited for EMR boys so that more needed to be done to encourage them to participate in athletics, 3) many individuals failed to recognize detrimental effects of deprivation, poor nutrition, and related areas of motor performance and physical performance of EMR persons, and, 4) active participation by EMR boys in interscholastic athletics should be encouraged.

139. FISHER, Kirk L. *Effects of a Structured Program of Perceptual-Motor Training on the Development and School Achievement of Educable Mentally Retarded Children.* (Office of Education Project No. 8B-104; Grant No. OEG-0-8-082104-4702 (032)). University Park: Pennsylvania State University, September 1969.

Effectiveness of participation in a structured program of perceptual-motor training on urban educable mentally retarded children (CA 6-10 to 10-11; IQ 50 to 80) was investigated. Subjects (N=102) were enrolled in urban public school special classes and were given the Purdue Perceptual-Motor Survey (PPMS). Results showed that 54 (males 36, females 18; Negroid 29, Caucasian 25) children had deficient perceptual-motor abilities. Each of these 54 children was randomly assigned to one of three groups: Training (T) which participated in an individualized, structured program of perceptual-motor training twice each week (30 minutes per session) for four and one-half months; Hawthorne (H) which met with the trainer but played table games instead of doing perceptual-motor training; Control (C) which maintained regular classroom schedules. All children in the three groups were given the PPMS, Wechsler Intelligence Scale for Children (WISC), Wide Range Achievement Test (WRAT), and Stanford Achievement Test (SAT) before training began. Following training, PPMS and WISC Tests were administered to all subjects; two months later the two achievement tests were administered.

Hypothesis I, which predicted improvement of perceptual-motor abilities as a result of training was not supported Analysis of perceptual-motor scores, using age and PPMS pre-score as control variables, revealed no significant differences among the three groups. A separate analysis computed for children under 10 years of age did reveal a significant difference in favor of Group T over Group C on PPMS total score; differences between T and H Groups were very close to statistical significance. Hypothesis II, which predicted improvement in intellectual performance, was not supported. No support was found for Hypothesis III which predicted improved achievement.

All three groups demonstrated significant improvement from pretest to posttest on PPMS total scores and on both achievement tests. In addition, both T and H Groups showed significant improvement in WISC Full Scale IQ, suggesting the importance of the Hawthorne effect on intelligence test performance.

Although there was some evidence that a short-term program of training in perceptual-motor abilities might be effective in improving perceptual-motor performance of EMR children younger than 10 years, there was no evidence that such short-term training affected intellectual functioning or school achievement of such children. Evidence showed that significant correlations did exist between perceptual-motor ability and intelligence and achievement.

140. FOSHEE, James G. "Studies in Activity Level: I. Simple and Complex Task Performance in Defectives." American Journal of Mental Deficiency 62: 5: 882-886; March 1958.

Measures of activity level on a modified ballistocardiograph were gathered from 101 mentally retarded subjects (CA 20 to 36). The 24 highest and 24 lowest subjects in terms of activity scores were compared in simple and complex learning situations. Assuming that activity level reflected amount of underlying drive, the Hullian formulation that varying levels of drive had differential effects upon simple and complex learning was examined. Results did not support the hypothesis of interaction between these two factors.

141. FRANCIS, R. J., and G. L. Rarick. *Motor Characteristics of the Mentally Retarded."* Washington, D.C.: U.S. Government Printing Office, Superintendent of Documents (U.S. Office of Education Cooperative Research Project No. 152 (6432), 1960. Article, "Motor Characteristics of the Mentally Retarded," in American Journal of Mental Deficiency 63: 5: 1959.

The purpose of this study was to compare motor performances of normal and mentally retarded children (N=284). Results showed

behavior modification as compared to the control group. Gains made by children receiving behavior modification treatment were retained after a three month period during which no treatments were administered.

143. FREEDMAN, Sidney. "School Camping: Experiment to Help the Mentally Handicapped." Camping Magazine 32: 34-35; March 1960.

This experiment analyzed values of school camping for five and six year old mentally retarded children. Subjects (IQ 35 to 65) were day toilet trained and could feed themselves. The program provided many new experiences, led to greater self-sufficiency and self-enjoyment, and gave parents of subjects a change of pace.

144. GARCIA, Marlene Orta. *Achievement in Selected Fundamental Gross Motor Skills of Educable Mentally Retarded Girls Enrolled in Special Education Classes in Selected Junior and Senior High Schools in San Antonio, Texas.* Master's thesis. Denton, Texas: Texas Woman's University, 1967.

The primary purpose of this study was to determine level of performance of educable mentally retarded junior (N-68; CA 12 to 16, $\bar{X}$ 15-1) and senior (N=12; CA 16 to 19, $\bar{X}$ 16-5) high school girls in selected fundamental gross motor skills. Comparisons were made among each of the age groups, between EMR junior and senior high school girls, and between EMR 13 and 14 year old girls with norms of 13 and 14 year old girls. Test items included 35-yard dash in which only the last 30-yards were timed, baseball throw, and standing broad jump. No significant differences were found among age groups in the dash or standing broad jump; only 13 and 15 year olds differed significantly in the baseball throw with younger girls performing better than the older ones. The EMR girls, on the average, scored significantly below performances for 13 year old girls based on norms for both dash and standing broad jump while 14 year old EMR girls scored significantly below norms for their age group on all three test items. No significant differences in performances were found in any test items when scores of junior high school girls were compared wity those of senior high school girls. Achievement scales (T scores) were developed for each of the test items to assist in classifying EMR girls on the basis of performances in fundamental motor skills involving running, throwing, and jumping.

145. GARRETT, Hayward P. and Katharine M. Jahns. *The Effects of Mental Retardation on Simple and Choice Reaction Times.* Special

research paper. DeKalb, Illinois: Northern Illinois University, n.d.

The purpose of this study was to determine effects of mental retardation on simple and choice reaction time (Stoalting Reaction Time Apparatus). Subjects were students from two classes in different schools--a mentally retarded group (N=14; CA $\bar{X}$ 11-2; MA $\bar{X}$ 7-11) and a regular third grade class (N=25; CA $\bar{X}$ 8-5; MA $\bar{X}$ 9-8). Each experimental session consisted of 20 trials--ten each to determine simple and choice reaction times; ten second rest periods were given between trials. No statistical differences were found between the two groups in either simple or choice reaction times. Factors the researchers felt could have influenced results included the two year-eight-month age difference between groups, differences in testing environments for the two groups, social effects, motivational differences, and observed frustration differences which generally favored mentally retarded subjects.

146. GEARHEART, Bill Ray. *A Study of a Physical Education Program Designed to Promote Motor Skills of Educable Mentally Retarded Children Enrolled in Special Classes in Cedar Rapids, Iowa.* Doctoral dissertation. Greeley, Colorado: Colorado State College (now University of Northern Colorado), 1963.

This study was designed to determine the practicability of a physical education program for educable mentally retarded children and to consider values of a special physical education program as opposed to a standard program in development of motor skills. Children in public elementary schools were given the hurdle jump, rail walking, broad jump, agility run, and picking up matchsticks as tests three times (September, January, May); total and sub-test comparisons were made according to chronological age, level of interest, and sex. As a result of pretesting, groups similar in performance were established with samples drawn at random from populations with the same means and standard deviations. The experimental group (special physical education program) performed better in hurdle jump, rail walking, and matchstick tasks. No differences in performances were found in broad jump and agility run tests or from sub-group analyses. The experimental program was felt to be worthwhile in developing motor skills.

147. GEDDES, Dolores M. *A Determination of the Influence of Mobility Patterning Techniques Upon Selected Motor Skills of Primary Educable Mentally Retarded Children.* Master's thesis. Greeley,

that mentally retarded youngsters were two to four years behind their normal peers in all motor activities tested. Trends in strength for mentally retarded subjects for each sex followed about the same patterns as those in normal children although at a lower level at every age. On power tests, age and sex differences were similar to differences reported for normal children. In running speed, balance, and agility, differences among levels of performances of mentally retarded youngsters followed the same general age and sex patterns as those observed in normal children. Discrepancies between retarded and normal children tended to increase at each successive age level; with complex skills discrepancies increased even more with increased age. Patterns of motor performance for mentally retarded subjects were similar to those of normal children in terms of age and sex; relationship of intelligence to motor performance tended to be positive. Scores of 24 institutionalized children (CA 7 to 12; IQ 15 to 50) and 60 preschool children were compared. Performances of the institutionalized children were comparable to normal youngsters three and four years of age; mongoloid subjects performed more poorly than familial subjects.

142. FREDERICKS, H. D. Bud. *A Comparison of the Doman-Delacato Method and Behavior Modification Method Upon the Coordination of Mongoloids.* Monmouth, Oregon: Teaching Research, A Division of Oregon State System of Higher Education, January 1969.

This was a nine-week investigation of effects of the Doman-Delacato method and behavior modification procedures (social reinforcement) on coordination of mongoloid children (N=63; CA 7-0 to 12-8). Subjects were randomly assigned to one of six groups: two received the Doman-Delacato method, two received behavior modification procedures, and two control groups. One group of each pair was pretested and tested every two weeks during training while the others were not tested until completion of training. The Doman-Delacato Profile and a modification of the Lincoln-Oseretsky Motor Development Scale were evaluation instruments used in the study.

No significant differences were found between results of the two treatment methods, although children receiving behavior modification demonstrated greater improvement in coordination at the end of the study than children receiving the Doman-Delacato method. No significant differences were found between results achieved by children receiving the Doman-Delacato method and the control group although those receiving the Doman-Delacato method did demonstrate more improved coordination than the control group. Significant improvements in both gross and fine motor coordination were achieved by children receiving

Colorado: Colorado State College (now University of Northern Colorado), 1967.

This study was designed to determine influence of mobility patterning techniques (crawling, creeping, walking) incorporated into gymnasium games and relays for an experimental group as compared with the influence of teaching selected motor skills (tumbling, ball handling, self-testing, trampoling, simple relays) to a control group. Two classes of seven primary educable mentally retarded students met daily for 30 minutes, five days a week for three months. All participants took the following tests prior to and at the end of the program: Cowan Pratt hurdle jump and standing broad jump (leg power), rail walking (dynamic balance), agility run (agility), and matchstick item from Oseretsky Test (fine manual coordination). Both programs appeared to contribute to the development of these traits. However the special physical education class appeared to contribute more than using mobility patterning techniques. The standing broad jump proved most successful in contributing to development of leg power, dynamic balance, agility, and manual coordination.

148. GEORGE, Colleen. "Motor Educability and Chronological Age as Potential Estimates of Errors in Perceptual-Motor Development of Educable Mentally Retarded Children." American Corrective Therapy Journal 26: 4: 105-107, 110; July/August 1972.

This pilot project was designed to estimate degree of accuracy with which performances of educable mentally retarded subjects could be predicted on the 30 item Purdue Perceptual-Motor Survey on the basis of chronological age and previous performances on the five item Carpenter-Johnson Test of Motor Educability. Subjects (N=14 males 12, females 2; IQ 55 to 70, $\bar{X}$ 61.9; CA 10-4 to 16-6, $\bar{X}$ 13.1) were given Purdue and Carpenter-Johnson Tests by two different graduate students in physical education. Forty-five minutes were required to administer the Purdue Perceptual-Motor Survey and 15 minutes for the Carpenter-Johnson Test. Results supported the hypothesis that chronological age and performances on the Carpenter-Johnson Test could be used with significant accuracy to predict performances on the Purdue Perceptual-Motor Survey. Zero-order correlation between the two tests when correlated for shrinkage was .79. Chronological age added significantly to the regression equation for predicting Purdue performances from a knowledge of Carpenter-Johnson performance; this correlation when corrected for shrinkage was .89. Seventy-nine percent of perceptual-motor performance variance was associated with motor educability and chronological age. The latter two variables appeared to be good predictors of the former.

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149. GEORGE, Colleen. "Reliability Estimates of Grip Strength Assessment in the Institutionalized Mentally Retarded." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington: D.C.: American Association for Health, Physical Education and Recreation, 1973.

In this study 48 right-handed students at Denton State School were given grip strength tests (Jamar dynamometer) to determine effects of tonic neck posture upon preferred and nonpreferred grips. Three different reliability estimates illustrated the fallacy of using simple product moment correlations as a measure of reliability. Institutionalized mentally retarded subjects in the study exhibited a wide range of ability as well as significant trial-to-trial variations in strength measures. Data were appropriate for application of an alternate reliability estimate as well as rationale for choice of a criterion measure as expressed in recent research reports of isometric strength. Possible reasons for variability in the institutionalized retarded subjects' strength scores were discussed. Suggestions were made for an alternate measurement schedule designated to reduce error variability in the institutionalized mentally retarded subjects involved in the study.

150. GERSHENSON, S. and M. Schreiber. "Mentally Retarded Teenagers in a Social Group." Children 10: 3: 104-108; May/June 1963.

A co-ed club consisting of ten mentally retarded individuals (CA 12 to 15; IQ 40 to 70) was set up to provide them with a medium of enjoyment in a setting that would develop and improve their social adjustment to and with other children their own age, including members of the opposite sex. The club program was designed to help the retarded participants accept themselves as they were and to aid them in developing useful skills. Criteria for club membership were: 1) chronological age of 12 to 15; 2) ability to participate; 3) capacity to derive benefit; and, 4) membership of parents in the Association for the Help of Retarded Children. The club met for two hours each week. Members participated in a variety of recreational activities and performed tasks of a functional nature. The program was judged a success because it helped the participants develop a functional association within a group and an ability to express themselves as individuals.

151. GIER, James D. *The Relationship of Physical Ability to Certain Psychological Scores and Ratings Among Mentally Retarded Boys.* Master's thesis. Seattle, Washington: University of Washington, 1959.

This investigation considered relationships between physical ability and certain psychological scores and ratings made on

prescribed tests by mentally retarded boys. Subjects (N=60) attended a provocational school and were selected on the basis of scores made on the Iowa-Brace Test. It was found that a greater relationship existed between physical ability and intelligence quotients among mentally retarded boys than among normal children; these correlation coefficients were very low.

152. GIDDINGS, William B. *Comparison of Activity Program Effects With Educable Mentally Retarded Children.* Master's thesis. Columbia, Missouri: University of Missouri, 1968.

This study was designed to compare effects of various activity programs on educable mentally retarded children. The Purdue Perceptual Motor Survey was administered before and after the program to evaluate perceptual-motor abilities. Four levels of programs were established based on chronological age and intellectual ability. Each level had control and experimental groups. Experimental groups participated in perceptual-motor activities, while control sections took part in nonperceptual-motor activities. Perceptual-motor performances were improved but not significantly for control and experimental sections of all levels. The only significant difference in performance noted was in favor of the experimental section at Level III.

153. GITTINS, John Arwyn George. *The Effects of a Program of Modern Educational Dance on the Perceptual-Motor Skills and Psycholinguistic Attributes of Trainable Mentally Retarded Children.* Master's thesis. Saskatoon, Saskatchewan: University of Saskatchewan, n.d.

The aim of this study was to determine effects of modern educational dance on measurable perceptual-motor skills (Cratty Los Angeles Perceptual-Motor Abilities Test), body image (Goodenough Draw-A-Man), psycholinguistic (Illinois Test of Psycholinguistic Ability) and intellectual (Weschler Intelligence Scale for Children) skills of trainable mentally retarded children attending a public special education school. Sixty TMR children were randomly assigned to three groups: 1) experimental participated in sessions of modern educational dance three times weekly for 12 weeks, 2) Hawthorne had quiet classroom activities such as records, story-telling, games, and films, and, 3) control had no extra activities. At the end of the experimental period all children were tested with the various instruments. Three tests discriminated in favor of the experimental group: visual closure (ITPA), gross agility (PMA), and Draw-A-Man; no significant differences were found for other tests administered.

154. GLANVILLE, Douglas and George Krezzer. "Deficiencies in Amplitude of Joint Movement Associated with Mental Deficiency." Child Development 129; June 1937.

A comparison was made of relationships of amplitudes of voluntary and passive joint-movements (plumb-line goniometer) between mentally normal (N=10; CA 20 to 43, $\bar{X}$ 28.2) and mentally deficient (N=10; CA 18 to 46, $\bar{X}$ 25.5; MA 9-0 to 9-9) adults. No special clinical types were found among the subjects. Amplitude of voluntary movements (89 percent) and passive movements (90 percent) was greater in the normal group. Existence of such associated defects in movement was likely to depend on etiological type involved.

155. GLASGOW, Martha Katherine. *The Relationship of Perceptual-Motor Performance and Intellectual Performance in Educable Mentally Retarded Children.* Master's thesis. Denton, Texas: Texas Woman's University, 1971.

The purpose of this study was to investigate relationships between perceptual-motor performance (Pearman modification of the Lincoln Revision of the Oseretsky Motor Development Scale) and intellectual performance (Wechsler Intelligence Scale for Children). Results of tests given to mentally retarded children (N=36; CA 10 to 12; IQ 50 to 70) revealed that a highly significant relationship existed between the three subgroup tests scores of the WISC and the Pearman modification of the Lincoln Revision of the Oseretsky Motor Development Scale.

156. GOHEEN, Royal L. *The Development and Evaluation of Three Types of Physical Education Programs for Educable Mentally Retarded Boys.* Doctoral dissertation. Boston, Massachusetts: Boston University, 1967.

The purpose of this study was to determine effects that skill-oriented, play-oriented, and free play types of physical education programs had upon the physical fitness (AAHPER Youth Fitness Test), motor ability (Latchaw Motor Achievement Test), and social adjustment (Cowell Social Adjustment Index) of educable mentally retarded boys (N=82; CA 10 to 15). Results indicated: 1) the skill-oriented program produced improvement in the largest number of items, increased agility, but caused more problems; 2) the play-oriented program gave the best opportunity for early success and also increased agility; 3) the free play program produced improvement only in related experiences; and, 4) in general it was found that EMR boys thrived on competition, benefited from age grouping, enjoyed less regimentation, and needed to understand expectations of others.

157. GOLDIAMOND, Israel. "Visual Signal Detection, Perception, and Response Variables as Functions of Development and Mental Retardation." Perceptual and Response Abilities of Mentally Retarded Children. Carbondale, Illinois: University Press, Southern Illinois University, 1959.

This study was devised to analyze perceptual responses of 50 mentally retarded and 50 normal children (CA 8 to 16; IQ 60 to 120). Subjects enrolled in educational institutions as normal classroom students, in special classroom for EMR's, and institutions for severely mentally handicapped were tested on psychophysical, reaction time, and size constancy tasks. It took more time to collect data from retarded children than from normal ones. Children with lower IQ's gave overestimated responses and false alarms during discrimination tests.

158. GOLLERT, Norman D. *The Effects of Exercise on Low-skill Work Capacity of Mentally Retarded Children.* Master's thesis. London: Ontario (Canada): University of Western Ontario, 1966.

In this study four matched groups of trainable mentally retarded children (CA 7 to 17) were tested on a battery of eight physical fitness items and on the laborimeter. Each group was then subjected to a different experimental treatment. From beginning to end of the experiment, the control group (Group I) improved laborimeter scores by 19 percent; the exercise group (Group II) by 37 percent; the laborimeter practice group (Group III) by 47 percent; and the laborimeter practice and exercise group (Group IV) by 64 percent. Groups II and IV made significant improvements in four physical fitness test items. By contrast nonexercise groups (I and III) made significant improvements in only one item--total strength.

159. GOODWIN, Lane A. *The Effects of Two Selected Physical Education Programs in Trainable Mentally Retarded.* Doctoral dissertation. Salt Lake City, Utah: University of Utah, 1970.

The purpose of this study was to compare effects of a traditional physical education program and a movement exploration program on physical fitness (Hayden Physical Fitness Test for Mentally Retarded), intelligence (Peabody Picture Vocabulary) and social maturity (Vineland Social Maturity Scale) of trainable mentally retarded children (N=33). Subjects from a training center for trainable mentally retarded children were divided into three groups of 11 each on the basis of chronological age, sex, and results of pretests. The study was conducted for ten weeks with the two experimental groups meeting for 30 minutes a day, five days a week. Experimental

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Group I was exposed to a traditional group oriented physical education program; Experimental Group II participated in a movement exploration program in which creativity was emphasized; the third served as a control group. All groups followed normal classroom routines and participated in the regular recreation program of the training center.

Findings revealed: 1) a significant difference in physical fitness scores of subjects in the experimental groups in favor those who participated in the traditional physical education program, 2) levels of fitness were improved in both experimental groups over the control group, 3) no significant difference in either experimental program as to its effect on social maturity of subjects, 4) IQ of subjects involved in the movement exploration program was significantly affected, and, 5) significant improvement between pre- and posttest mean scores of both experimental groups exposed to physical education programs in all three variables--physical fitness, IQ, and social maturity.

160. GRAF, Gilbert Thomas. *An Analysis of the Physical Fitness of Trainable Mentally Retarded Adolescent Youth.* Master's thesis. Columbus, Ohio: Ohio State University , 1962.

Levels of physical fitness (AAU Physical Fitness Test) of 70 trainable mentally retarded adolescent youth (CA 12-1 to 17-1; IQ 25 to 50; social age 2-8 to 16-8) enrolled in a special school were investigated. Analyses compared 1) percentage of retarded youth who passed the AAU test to national norms, 2) those who passed according to IQ levels--those with IQ's above 40 with those below 40, 3) those who passed according to such classifications as brain damaged, mongoloid, and unclassified, 4) those who passed according to social age--those eight and above with those under eight, and 5) those who passed according to sex. Findings indicated that specific physical fitness activities should be a part of physical education programs for retarded youth in special schools and that IQ, etiology, and social development could be used as a basis for grouping for physical fitness activities.

161. GRAF, G. T., E. Namy, and S. Woitovich. *The Influences of Intelligence, Social Maturity, and Chronological Age on the Ability of Trainable Retardates to Learn Swimming Skills.* Ashtabula, Ohio: Ashtabula County Retarded Children's School. n.d.

This study was designed to determine factors which contributed to trainable mentally retarded children learning basic swimming skills. Subjects (N=24; CA 7 to 17; IQ 27 to 53; swimming scores

5 to 35), who had no previous formal swimming instruction took a 70 minute lesson every day for 10 consecutive days. The researchers concluded that of primary characteristics studied--relationships between swimming scores and chronological age, social quotients, and IQ--intelligence was the most important factor in determining success of TMR children in acquiring swimming skills.

162. GRAVELINE, William E. *A Study of the Effect of a Physical Education Program on the Manual Dexterity of Educable Mentally Retarded Boys at the Opportunity Training Center at Grand Forks, North Dakota.* Master's thesis. Grand Forks, North Dakota: University of North Dakota, August 1968.

Experimental (N=7; CA 16 to 21; IQ 56 to 78) and control (N=7; CA 18 to 21; IQ 59 to 78) groups of educable mentally retarded male subjects were compared on four measures of manual dexterity (U.S. Department of Labor General Aptitude Test Battery, assembly and disassembly tasks consisting of putting washers on rivets and then placing them on corresponding holes on a board, adaptations of Minnesota Pegboard Test, and a turning task) to determine effects of a structured physical education program on manual dexterity of these boys. The experimental group participated in a structured physical education program consisting of 80 percent arm and hand development and 20 percent gross muscle development. This special program consisted of 24 one-hour class periods, three per week, for eight weeks. During this time, the control group was enrolled only in a vocational training program. Analyses of results indicated that the experimental group made significant gains on two of the four test items and it was concluded that participation in the physical education program did improve manual dexterity of these mentally retarded boys. Several important observations were also reported: 1) physical disabilities such as cerebral palsy and muscular dystrophy influenced performances of subjects; 2) performance of certain activities was affected by a pyramiding effect where success or failure on one part determined success or failure on succeeding aspects of a task; 3) the specific nature of physical and motor activities was apparent as some subjects who did poorly on those test items did well in other activities such as ceramics; and, 4) importance of basic elements of physical fitness and basic motor performance as the base for many activities was noted so that at certain points and at specific levels, education of the physical cannot be overlooked or neglected.

163. GREENFELL, James E. *The Effect of a Structured Physical Education Program on the Physical Fitness and Motor Educability of the Mentally Retarded School Children in Whitman County, Washington.*

Master's thesis. Pullman, Washington: Washington State University, 1965.

Effects of a structured physical education program on levels of physical fitness (Washington State Physical Fitness Test) and motor educability (Johnson-Metheny Test) of mentally retarded school children were investigated. Subjects enrolled in special education classes in three public schools participated in the structured program (N=25; CA 7-6, 10-22, 14-12; MA 4-6, 7-5, 8-9). Additional information was obtained from check lists of specific skills and teacher appraisals of each child's self-concept and motivation. The ten-week program showed: 1) primary grade retarded children had the capacity to learn the same basic motor skills as normal children, 2) levels of physical fitness needed to be improved, 3) motivation and success were essential to learning motor skills and attaining desired levels of fitness 4) effects of social and intellectual growth resulted from the structured program, and 5) carryover value of achievement in physical education to other classes and activities in the total school program was noted.

164. GROSS, Edward A. *Survey of Physical Education for Educable Mentally Retarded Children in Public Schools Throughout the United States.* Master's thesis. Lawrence, Kansas: University of Kansas, May 1973.

The purpose of this investigation was to survey via mail questionnaire the status of physical education programs for educable mentally retarded children in public schools throughout the United States. Questionnaires based on Brace's 1966 study and on input from personnel in the field were sent to special educators selected randomly in 14 states; selection was based on a stratified random selection from the six American Association for Health, Physical Education, and Recreation Districts. Of 100 questionnaires sent to each District (N=600), 298 (49.7 percent) were returned; 281 of these responses were usable. Results showed: 1) physical education to be a part of educational programs for EMR children in these public schools, 2) EMR boys and girls within sampled districts were integrated with normal children for physical education and were provided with a variety of activities during the school year, 3) attitudes of children toward physical education were positive, 4) EMR students did not have opportunities to participate in school intramurals or in regularly scheduled recreational activities in their communities, 5) physical education progress of these children was evaluated by a variety of systems but in many instances no evaluations at all were reported, 6) either no local and state supervisors of physical education for EMR pupils existed or if so they rarely observed teachers of these physical education programs, 7) most respondents felt that their professional preparation was

predominantly in special education with little exposure to physical education, and 8) the majority of these educators felt they needed more training to be professionally qualified to teach physical education to EMR children.

165. GROSS, Linda. *The Development of a Physical Education Program for Trainable Mentally Retarded Children and Young Adults.* Birmingham, Alabama: Opportunity Center School, August 1967. (Final report of Project No. 6-8564, Grant No. OEG-2-7-068564-0272, U.S. Office of Education, Department of Health, Education, and Welfare, Washington, D.C.)

This project was designed to determine effects of a six-month organized physical education program on motor ability (six items modified from AAHPER Youth Fitness Test and six items designed by the researcher) and social adjustment (TMR Performance Profile and a Parent Checklist designed by the researcher) of a group of trainable mentally retarded individuals (N=87 total, CA $\bar{X}$ 13-4, IQ $\bar{X}$ 46; N=67 day school students; N=20 young adults from a sheltered workshop) who were randomly assigned to experimental (N=43) and control groups (N=44). Subjects assigned to the experimental group were removed from their classes three days a week for six months to participate in an organized physical education program consisting of body mechanics, fundamental locomotor movements, basic skills, games, relays, musical and rhythmical activities, tumbling, and quiet games. Primary and intermediate level children (CA 6 to 12) had one-half hour periods and prevocational and adult level subjects (CA 13 to 26) had 45 minute periods. The control group stayed in their classrooms and participated in usual classroom activities while the physical education program was in progress; they did have daily instructional recess and free play periods. Results showed: 1) significant improvements for the experimental group in three (standing broad jump, toe touch, skip) of the 12 motor ability items, and 2) no significant differences between groups for either TMR Performance Profile or Parent Checklist.

166. HALPIN, Virginia and Ruth Patterson. "The Performance of Brain-Injured on the Goldstein-Scheerer Test." American Journal of Mental Deficiency, 59: 91-99, 1954.

Differences in performances between brain-injured and mentally deficient children were determined on the basis of three Goldstein-Scheerer Tests. Fifteen children in each group (CA 7-4 to 13-5) were matched according to IQ, sex, educational achievement, and duration of institutionalization. The Goldstein-Scheerer Stick Test appeared to be useful in analyzing types of visual-motor disturbance. This test indicated that among brain-injured chil-

dren, rotations and breakdowns of gestalt on the fitures were more prevalent than in mentally deficient subjects.

167. HANSEN, Linda Sue. *The Effects of Coaction and Selected Grouping Procedures on the Learning and Performance of a Motor Task By Educable Mentally Retarded Pupils.* Master's thesis. Brockport: New York: State University College at Brockport, 1972.

The purpose of this study was to investigate effects of coaction and selected grouping procedures on learning and performance of a motor task of educable mentally retarded pupils (N=54, CA 11 to 16; IQ 50 to 75). Subjects were grouped as follows: 36 were paired and randomly assigned to one of three groups: 1) intraclass (subjects in the same class), 2) interclass (subjects from two different classes), and 3) alone group. Each of the other 18 subjects was paired with one of the subjects in either intraclass or interclass groups when it was necessary to create an interclass pairing within specific subgroups; each of the groups consisted of two subgroups. Subjects in each subgroup were tested in two different phases according to criteria which had been established for 1) learning and for 2) performance. Criterion established for both phases was represented by a predetermined number of trials. Results from pilot work indicated that ten trials were sufficient for subjects to learn the task. To investigate effects coaction and selected grouping procedures had on learning and performance, a novel task (Tapping Test) was selected. Subjects were given ten trials for learning and for performance. Results indicated that learning had continued into the second phase performance of testing. Results using means of first and second sets of trials as criterion scores produced significant results only in factor A (phase I and phase II). Since there were no significant differences with factor B (groups) and factor C (subgroups), significant results in factor A were attributed to practice effects of the first ten trials. It was concluded that coaction and selected grouping procedures, as employed in this investigation, did not have a significant effect on learning of a simple motor task.

168. HANSON, Muriel E. *A Factor Analysis of Selected Body-Image Test Appropriate for Use With the Mentally Retarded.* Doctoral dissertation. Denton, Texas: Texas Woman's University, 1973.

Factor analysis was used to identify factors in seven selected tests which purported to measure body-image. Subjects were 88 educable mentally retarded boys and girls (CA 8 to 10). The seven selected body-image tests included: 1) Body Perception (Cratty), 2) Purdue Perceptual-Motor Survey (Roach and Kephart),

3) Imitation of Gestures (Berges and Lezine), 4) Hand, Eye, and Ear Test (Head), 5) Body-Image Identification Test (Gottesman and Caldwell), 6) Finger Localization (Benton), and 7) Body-Image Stereotype Test (Staffieri). Each subject's age and sex were added to the 22 test variables for a total of 24 variables. The principal axes factor analysis with the varimax rotation extracted nine factors which accounted for 70 percent of possible variance. Factors were named as follows: 1) finger localization and visual discrimination, 2) identification of parts, surfaces, and sides, 3) male and female body type identification, 4) planning and execution of motor tasks, 5) stereotyping of body builds, 6) recognition of masculinity-femininity traits, 7) ectomorph body type, 8) identification of male-female upper and lower limbs, and 9) somatotype choice. Factor names were descriptive in nature of interrelationships in variables involved in the factors. Tests which best measured the nine body-image factors were determined by selecting the highest loading variable in each factor. It appeared that the nine factors adequately defined body-image as measured by the 24 variables.

169. HARKLEROAD, Alvin Dwayne. *The Effect of A Planned Program of Physical Education Upon the Motor Performance of Educable Mentally Retarded Eighth Grade Boys*. Master's thesis. College Park, Maryland: University of Maryland, 1966.

Effects of selected physical education units on motor performance of educable mentally retarded boys (N=39; CA 13 to 16; IQ 60 to 80) integrated in public school eighth grade physical education classes were studied. Test items (dodge run, balance test, hand dynamometer, vertical jump, and 50-yard dash of which 30 yards were timed) were administered to students in three different physical education classes at beginning and end of five week units. One class took part in health education activities; the second class participated in tumbling; the third class took part in track and field activities. No significant differences were found among classes in age, IQ, and in each of the motor performance items at the beginning of the programs. Both activity groups did significantly better on the post test dodge run than the health group but were not significantly different from each other; on all other items there were nonsignificant trends favoring activity groups. The investigator concluded: 1) track and field activities brought about greater improvement in motor performance of EMR boys than tumbling, 2) track and field and tumbling were activities appropriate for educable mentally retarded, and 3) five week units were not too long to hold interest of educable mentally retarded boys.

170. HARTSHORN, Helen Marion. *A Model for a Dual Programmed Summer Day Camp for Mentally Retarded Children.* Doctoral dissertation. Athens, Georgia: University of Georgia, 1971.

This study contains a model for a dual programmed summer day camp for mentally retarded children. The model was designed to offer an on-going and progressive program which would contribute to the total development of mentally retarded children through specialized program planning that included an academic program in a completely recreational environment. The program was specifically designed to contribute to social development associated with recreational activities, motor skill development associated with specialized physical education activities, and intellectual development associated with academic activities. The model included criteria for selecting personnel, selecting campers, facilities, administrative organization, evaluating campers and programs. The model was evaluated by a panel of authorities in physical education, special education, and recreation.

171. HAWKINS, William F. and Jean Holland. "Motor Learning and Knowledge of Results." American Journal of Mental Deficiency 70: 590-594; January 1966.

Purpose of this study was to determine whether supplementary knowledge of results differentially affected normal (N=48; CA $\bar{X}$ 14) and mentally retarded (N=48; CA $\bar{X}$ 14; IQ $\bar{X}$ 79.3) children with respect to motor performance (Lafayette Pursuit Rotor) and associated phenomona such as reminiscence and warm-up decrements. Neither the main effect of knowledge or results nor any of the interactions were significantly different between the two intelligence groups.

172. HAYDEN, Frank J. "The Influence of Exercise and Sport Programs on Children with Severe Mental Deficiency." Mental Retardation 15: 3: 13-17; Fall 1965.

This study was designed 1) to devise and adapt physical fitness tests for use with 360 children catagorized as physically handicapped, mentally retarded, and emotionally disturbed and 2) to compare results with those obtained from a large sample of nonretarded boys and girls. Thirty-five tests were considered valid to measure strength, power, muscular and organic endurance, flexibility, and physique of retarded children. Results showed: 1) nonretarded girls were stronger than retarded boys, 2) performance levels of retarded children were from four to six years behind normal children, 3) differences between normal and retarded children increased at each successive age level, and

4) degree of improvement in physical fitness measures was highly significant for retarded youngsters after training.

173. HAYDEN, Frank J. "The Nature of Physical Performance in the Trainable Retarded." *Expanding Concepts in Mental Retardation* (George A. Jervis, Editor). Springfield, Illinois: Charles C. Thomas Publisher, 1968, 219-226.

This describes individual differences in physical performances of trainable mentally retarded boys and girls. Stability or reliability of physical performances was related to intelligence, psychological development, and sex differences. Results showed: 1) physical performance of trainable boys and girls had little or no relationship to IQ, 2) relationships between IQ and measures for walking and running endurance were higher for girls than boys, 3) physical performances were remarkably stable from day to day, 4) ratings of psychological development of individual students by physical education, swimming, music, and classroom teachers were related, 5) boys were shorter and heavier than girls, and 6) walking and running endurance performances were related to teacher's ratings.

174. HAYDEN, Frank J. "Physical Fitness at Camp Shriver." Washington, D.C.: The Joseph P. Kennedy Jr. Foundation, 1967.

Educable and trainable mentally retarded boys (N=61; CA 7 to 15) and girls (N=52; CA 7 to 15) who attended a summer day camp were tested on the seven item AAHPER Youth Fitness Test; sit-ups, pull-ups, and walk-run events were modified for use with retarded children as recommended by Rarick. Comparisons with national norms showed that 1) campers' median performance ranked at the seventh percentile for normal children and at the 23rd percentile for educable mentally retarded children, 2) poorest performances were recorded on the 300-yard run and flexed arm hang, and 3) about ten percent of the children demonstrated exceptional potential with performances above the 90th percentile for normal children. Evaluation of scores in terms of proposed standards for a national awards program for retarded children indicated that with very little practice and training 40 percent or more could win an award, 20 percent could win an advanced award, and 5 percent could win a special award for exceptional achievement. Recommended standards were considered reasonable for use with both educable and upper level trainable retarded children.

175. HAYDEN, Frank J. "Physical Fitness for the Mentally Retarded." Toronto, Ontario (Canada): Metropolitan Toronto Association for

Retarded Children, 1964.

This booklet contains information and materials on measuring and building specific traits of muscular and organic fitness of trainable mentally retarded boys and girls (CA 8 to 17). It is based on a cooperative research program carried out for six years in Canada. Tests of muscular fitness include 1) straight arm bar hang, 2) medicine ball throw, 3) back extension flexibility, 4) speed back lifts, 5) speed sit-ups, 6) vertical jump, and 7) floor touch flexibility; the 300-yard run is used to measure organic fitness. Standard scores for each item provide seven classification steps (from very poor to excellent) in two year steps for both boys and girls. Sections offer suggestions for selecting activities and planning programs in terms of applying basic principles to meet fitness needs of specific youngsters.

176. HAYES, Gene A. *A Case Study of Municipal Recreation Programs for Senior Citizens and the Handicapped.* Doctoral dissertation. Denton, Texas: North Texas State University, August 1971.

This investigation studied programs Texas municipal parks and recreation departments provided for senior citizens, and for mentally retarded, physically handicapped, and emotionally disturbed persons. Information was first gathered from a statewide feasibility survey which included all municipal parks and recreation departmens in Texas. This survey provided sufficient evidence to indicate that more intensive case studies were warranted; 15 municipal parks and recreation departments were selected for such study. Only municipal parks and recreation departments which had provided recreation programs for at least two of the four special groups were considered. Five departments were included in each of three categories: departments providing recreation services to 1) all four special groups, 2) three of the groups, and 3) two of the groups. Criteria used to aid in selecting cases were number of participants in programs, population of communities, and geographical location of communities.

Detailed information about each of the 15 selected case studies was reported. Findings obtained in each case were studied carefully for similarities and reported according to: 1) when and how program developed, 2) philosophies, 3) finances, 4) leadership, 5) locating participants, 6) determining activities, 7) cooperating agencies, 8) communications and public relations, 9) transportation, 10) liability coverage, medical clearance, physical examinations, 11) most and least effective activities, and 12) factors contributing to the success of the program. Recommendations for developing a recreation program

for persons with handicapping conditions and for senior citizens in the community are presented with special attention to each of the listed areas.

177. HAYWOOD, H. Carl and S. Joseph Weaver. "Differential Effects of Motivational Orientation and Incentive Conditions on Motor Performance in Institutionalized Retardates." American Journal of Mental Deficiency 72: 3: November, 1967.

This study was designed to assess persistence or vigor with which institutionalized mentally retarded subjects performed a simple motor task as a function of individual motivational orientations and kinds of incentive conditions used to stimulate performance. Subjects (extrinsically motivated EM=40; intrinsically motivated IM=40) had two common characteristics--mental age of six or more and absence of gross motor or sensory defects--and were selected for either EM or IM group on the basis of responses to the choice-motivator scale (20 pairs of vocational titles in which each subject selected one title and gave reason for selection; reasons were scored by a standard manifest content analysis). Subjects who were motivated by environmental conditions such as salary, safety, ease, comfort, and security were categorized as EM while those motivated by intrinsic or self-actualization objectives such as opportunity to learn, challenge, and intense psychological satisfaction were considered IM. Subjects were given a common task (punching in four 60 second trials as many holes as they could). Each group was divided into four subgroups with each receiving a different incentive condition--1) do a good job and get another task to do; 2) receive a dime; 3) get a penny, and 4) have another chance to repeat the task. Results showed that IM subjects punched more holes under the task incentive while EM subjects performed better when money was the motivating device.

Determining factors that motivate different people can lead to improved performance on a job or in school.

178. HEAD, Dwayne G. *A Comparison of Motor Abilities of Normal and Mentally Retarded Children.* Master's thesis. Brookings, South Dakota: South Dakota State College, 1969.

This study was undertaken to determine differences in selected motor abilities between normal (N=74; CA 8 to 15; IQ over 70) and mentally retarded (N=73; CA 8 to 15; IQ under 70) children. Motor abilities considered were: 1) motor educability (modified Iowa Brace Test), 2) performance time multiple choice response timer), and 3) accuracy in throwing (throwing darts at a target of concentric circles). Test results

showed that in nearly all age groups, normal boys and girls were superior to retarded students in motor abilities measured. When normal students were compared as a whole to retarded students as a whole, differences were even more apparent and more significant.

179. HEATH, S. R., Jr. "The Military Use of the Rail-Walking Test as an Index of Locomotor Coordination." Psychological Bulletin 40: 4: 282-284; April 1943.

Three groups of soldiers were given a rail-walking test which consisted of walking three rails 9'4", 9'2", and 6'11" wide. The first group (N=73) consisted of randomly selected white army men whose average score was 134.41 points out of a possible 153 points; none scored less than 94 points. The second group (N=94) contained soldiers who were considered unsuitable for duty in tactical situations; they averaged 86.06 and over 50 percent had less than 94 points. The third group (N=48) was made up of soldiers with problems of locomotor coordination; they averaged 68.98 points with over 80 percent scoring less then 94 points. Many times low test scores were due to intellectual or emotional problems. At upper levels of locomotor coordination the rail-walking test did not differentiate well. This test proved to be useful in the Army as a gross instrument for diagnosing awkwardness and predicting trainability.

180. HEATH, S. R., Jr. "Rail-Walking Performance as Related to Mental Age and Etiological Type Among the Mentally Retarded." American Journal of Psychology, April 1942. pp. 240-247.

Three implications drawn from this study transcended specific results: 1) conclusions suggested that etiological classification might be determined through rail-walking test performances, 2) mental deficiency should not be treated as an entity without concern for etiological types, especially with regard to motor performances, and, 3) support of the motor response theory of consciouness stating that there can be no consciousness of a stimulus unless an organism has responded to that stimulus (i.e., without motor activity there can be no consciousness). Implications were based on marked relationships between mental age and rail-walking performances of endogenous mentally retarded males. Performances, showing marked increases after a mental age of eight, were found to be more closely related to mental age than to chronological age. However, no apparent relationship was evident with the exogenous group.

181. HEEBOLL-Nielsen, K. R. "The Physical Performance of Mentally Retarded Patients and Their Possibilities for Being Trained--Investigated with Psychotechnical Tests." Communications

Hellerup, Denmark: The Danish National Association for Infantile Paralysis, 1967.

Purposes of this study were 1) to standardize a simple work-like test, 2) examine whether mentally retarded subjects obtained levels of motor function consistent with those of normal persons and, 3) determine whether there were differences between groups during training. A bimanual coordination test in which each subject was required to insert a rod into a canal with his right hand and remove it with the left hand was used as the training task; scores were based on the number of rods passed through the canal in a minute. Three groups were involved in the study: 1) 100 pupils from normal, special, and debiles schools, 2) 150 imbeciles from occupational schools and workshops, and, 3) 26 pupils with Down's syndrone. Results showed that all three groups improved with each minute of training; as intelligence quotient decreased, amount of work output also decreased. Mentally retarded subjects were capable of being trained to perform the task if instructors took time and had the patience. There was so little correlation between IQ and manual performance that IQ was almost useless for predicting manual ability. The study also indicated that these mentally retarded persons retained the ability to perform well-learned tasks almost as well as normal subjects.

182. HEEBOLL-Nielsen, K. R. "The Relation Between the Physical Achievements of Normal Individuals and Mentally Retarded Patients." Hellerup, Denmark: The Danish National Association for Infantile Paralysis and Danish National Service for the Mentally Retarded, 1964.

This study was designed to determine degree of physical handicaps in comparison with mental handicaps of mentally retarded patients. Subjects (N=10; CA $\bar{X}$ 24; IQ $\bar{X}$ 30) were given a finger coordination test closely approximating every day factory working conditions. They were required to push smooth brass rods through a hole in a wooden block with the right hand and take them out with the left hand; scores were number of rods passed through the hole in one minute. After a minute's rest, the test was repeated with each subject having 10 one-minute tests. Standardized norms were established for both normal and retarded subjects. Subjects were given 21 days of training that consisted of ten one-minute trials each day. In three weeks retarded subjects improved from an average of 40 percent of scores reached by normal subjects to 70 percent of their scores.

In a second study involving ten tests of muscular strength, subjects (N=52)were tested and performances compared with mean

scores of 96 soldiers. Initially thumb pressure of retarded subjects was 80 percent that of normal soldiers, upper extremity strength about 55 percent, trunk 40 percent, and lower extremity about 30 percent. After initial testing, subjects were divided into two groups of 26 (one group of mongoloids and one group of nonmongoloids); each group was subdivided into experimental and control groups. Experimental groups received 29 days of training which involved lifting a weight ten times a day by pulling down on a rope. Experimental groups became stronger than control groups; mongoloid subjects improved 68 percent and nearly reached levels of nonmongoloid subjects who improved 35 percent. Control groups showed no significant improvement. It was concluded that adult retarded subjects were considerably weaker than normal adults. Lower extremities were most retarded, approximating level of eight or nine year old normal children; thumb pressure approximated levels for 15 or 16 year-olds; arm power approximated that of 12 year olds. Mental ages of retarded subjects were lower than physical ages and their mental performances were inferior to physical performances.

183. HIGGS, Reginald W. *Comparison of Performances of Normal and Educable Mentally Retarded Boys on Motor Tasks of Varied Complexity.* Master's thesis. University Park: Pennsylvania State University, 1968.

This study was designed to compare performances of normal and educable mentally retarded boys (CA 9 to 12) on six motor tasks: simple hand reaction time, simple foot reaction time, hand movement time, foot movement time, a simple motor act involving both reaction and movement times, and a more complicated motor task. Mean performances of intellectually normal boys were superior to those of retarded subjects on all motor tasks. Relationships between intelligence and motor performances on all tasks were not significant within either group. However, significant relationships were found between intelligence and performance in the combined groups on all tasks performed.

184. HILLMAN, William A. "State Recreation Planning for the Retarded." *The Best of Challenge.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1971. p. 206.

This reports analysis of state plans for improving recreational programs and services for mentally retarded persons. It discusses briefly grants to states for providing comprehensive services and points to a general lack of recreation opportunities contained in these plans. Analysis of the 51 available state comprehensive mental retardation plans revealed that a number of areas received

considerable attention. Major areas of concern in planning for retarded persons included manpower, financing, education, facilities, law, planning, research, vocational rehabilitation, legislation, and residential care. Attention to recreation planning was quite limited--only seven states had specific task forces or study groups dealing with recreation, although four additional plans did indicate substantial concern for recreational services. Of all recommendations made in the state comprehensive mental retardation plans, only 226 related to recreation; 55 percent of these were found in seven plans! Continued concern and stimulation by both federal and voluntary agencies resulted in some additional recreational planning for mentally retarded persons in certain states. Need was evident for greater stimulation and guidance for adequate planning if the 80 percent of mentally retarded persons who were not participating in recreational activities were to become active and involved. Credit was given to states with inclusive sections within their comprehensive plans--Washington, Iowa, Connecticut, South Carolina, and Delaware.

185. HILLMAN, William A., Jr. "Therapeutic Recreation With the Profoundly Retarded." Recreation for the Ill and Handicapped April 1966.

The value of an intensive recreation program in improving the physical, motor, and social traits of a group of profoundly mentally retarded children was investigated. Since most recreation activities were carried on within living facilities of subjects, they were divided into three groups on the basis of cottage assignments: Cottage One (N=115; CA Median 34; MA Median 1-9 IQ Median 15); Cottage Two (N=90; CA Median 13; MA Median 1; IQ Median 10); and, Cottage Three (N=90; CA Median 12; MA Median below 1; IQ Median below 10). The program emphasized normal group activities consisting of modifications and adaptations of preschool and kindergarten activities. Reevaluation of groups after four months of this program indicated that, in general, behavior had become more adaptive, and there was improvement in sociability, manipulative skills, and physical coordination.

186. HOFMEISTER, Alan M. *The Relationship of Motor Proficiency to Academic Achievement and Selected Socio-Personal Variables in Educable Mentally Retarded Children.* Master's thesis. Eugene, Oregon: University of Oregon, 1967.

This study investigated interrelationships between motor proficiency (Lincoln-Oseretsky Motor Development Scale) and selected variables including mental age (Weschler Intelligence

Scale for Children), chronological age, school achievement (Wide Range Achievement Test), sociometric status (questionnaire), and classroom behavior (check list) in a selected sample of educable mentally retarded boys and girls enrolled in a public school program. A significant relationship was found between motor proficiency and arithmetic achievement that was not accounted for in terms of common relationships between mental and chronological ages. A significant relationship was also found between motor proficiency and sociometric status as measured in the class setting. Level of motor proficiency was related to the incidence of more severe forms of behavior disturbance. Motor proficiency was a better estimate of a child's adjustment than mental age due to relationships between behavior disturbances and motor abilities.

187. HOLLINGSWORTH, Jack D. *A Comparison of Motor Ability of Mentally Retarded Children of Specific Mental and Chronological Ages and Normal Children.* Doctoral dissertation. Athens, Georgia: University of Georgia, 1971.

Motor performances of mentally retarded and normal children on Lincoln-Oseretsky Motor Development Scale were compared. Subjects (CA 8 to 10) were grouped as follows: mentally retarded subjects on the basis of both chronological and mental ages; normal group on basis of chronological age. Mentally retarded subjects grouped according to mental age were significantly superior to normal children in motor performance, while the normal group was superior to the mentally retarded-chronological age group. Positive progression of motor performance was found in each group classification from one age level to the next higher level. Relationship of motor performance to intelligence was found to be low but positive in the mentally retarded group but was essentially zero for the normal group.

188. HOLT, L. E., L. M. Joiner, A. F. Holt, and A. J. Shaftner. "Silvia Versus Red Cross Methods in Teaching Swimming to Educable Mentally Retarded Children." American Journal of Mental Deficiency 74: 483-487; 1970.

This study compared Red Cross and Silvia methods of teaching swimming to educable mentally retarded children. Subjects (N=40; CA 12 to 15) were randomly selected from a population of 150 children; four subjects were excluded from the study because of severe neuromuscular disabilities; the remaining 36 were assigned randomly to four treatment groups--two experimental (Silvia) and two control (Red Cross). Each group had three lessons of experimental swimming instruction per week for six

weeks; each lesson lasted 30 minutes. Two certified water safety instructors were assigned randomly to treatment groups. A Multiple Linear Regression Analysis was used to determine which method produced superior performances for distance using front crawl and back strokes. Groups using the Silvia method swam front crawl distances significantly greater than those using the Red Cross approach. No significant differences were found in back stroke performances.

189. HORNE, Betty M. and Charlotte C. Philleo. "A Comparative Study of the Spontaneous Play Activities of Normal and Mentally Defective Children." The Journal of Genetic Psychology 61: 33-46; 1942.

Toy choices and play activities of two groups of retarded children (IQ boys $\bar{X}$ 68, girls $\bar{X}$ 66) and a group of normal (IQ $\bar{X}$ 104) children were observed. Children were exposed to toys in a room, where they were invited to select toys of their own choice. Although influence of institutional environments of normal children was unmeasureable, differences in choide of materials were significant. Little difference was noted between the sexes in choices of play activity. Greatest differences were observed in preferences of normal children for play materials which led to constructive activities; this was less prevalent in both groups of mentally deficient children. Play periods showed less definite trends than choices of play articles.

190. HOWE, Clifford E. *Motor Characteristics of Mentally Retarded Children.* Doctoral dissertation. Iowa City, Iowa: University of Iowa, 1957. Article "A Comparison of Motor Skills of Mentally Retarded and Normal Children," in Journal of Exceptional Children 25: 352-354; April 1959.

Relationships between intelligence and motor performance in both mentally retarded and normal (CA 6 to 12) children were examined with a battery of 11 tests: Sargent Jump, balancing on one foot, tracing speed in 45 seconds, tapping speed in 30 seconds, dotting speed in 30 seconds, grip strength, zigzag run, 50-yard dash, squat thrusts in ten seconds, ball throw for accuracy at 15 feet, and paper and pencil maze test. Normal boys were significantly superior on all 11 motor tasks; normal girls were significantly superior in nine of the 11 tasks. A wide range of scores was noted in both groups with no definite pattern established and a great deal of overlap found between achievement of normal and retarded subjects.

Physical education programs for both retarded and normal children were felt needed and desirable to develop motor skills and to enhance acceptance.

191. HOWE, Clifford E. "Compensation or Correlation?" Education 80: 6: 341-343; February 1960.

Knowledge and research pertaining to the motor abilities of mentally retarded children are summarized in this study. In studies using the Purdue Pegboard Scale to measure arm-hand and finger dexterity of mentally retarded subjects, results indicated they were inferior in this kind of motor coordination. A study in which motor characteristics of 284 mentally retarded children attending public schools were analyzed, mean scores for both retarded boys and girls were from two to four years below chronological age level norms; differences between performances of normal and the mentally retarded children increased as youngsters grew older and were greatest for tasks that were complex in nature. Professional literature indicates that mentally retarded persons are also retarded in motor skills. Research has suggested that correlation, not compensation, is the law of nature.

192. HUNT, B. M. "Performance of Mentally Deficient Brain-Injured Children and Mentally Deficient Familial Children on Construction Form Patterns." American Journal of Mental Deficiency 63: 679-687; 1959.

This study was designed to compare three groups of mentally deficient children--brain-injured with severe visual motor handicaps (N=30), brain-injured with severe auditory handicaps and mild visual motor handicaps (N=30) and familial mentally retarded (N=30). Subjects constructed designs with three dimensional snap blocks. Ability differences were not dependent on chronological age or IQ. There was a fairly high positive relationship between mental age of familial subjects and performance. Those with visual motor impairment had lowest scores while those with auditory impairments had highest scores.

193. JANUS, Robert Joseph. *A Study of Motor Performance in Relation to Persistence of Effort of Hyperactive Brain Damaged Children.* Master's thesis. College Park, Maryland: University of Maryland, 1966.

The purpose of this study was to determine relationships between 1) mental age of brain damaged children and length of time a subject was willing to spend repeating a simple motor task (walking patterns on an automated training machine) and 2)mental

age with number of tasks or trials a subject was willing to initiate during time spend with the machine, and 3) chronological age of brain damaged children and termporal and quantative responses on the machine. Subjects (N=52; female 10, male 42; CA 5-10 to 13-11; IQ 38 to 114) were drawn from five elementary schools in the same county; children with cerebral palsy and visible physical defects were not included in the study. Correlations assuming both linear and non-linear relationships among time, trials, CA, and MA were computed; partial correlations were computed between time and MA and time and trials with CA held constant in each case. Results revealed relationships between time and MA, time and CA, trials and MA, and trials and CA when non-linear relationships were assumed; these relationships were not found when linear relationships were assumed. Subjects tended to take a longer time to become satisfied as MA decreased, to take more trials as MA decreased, and showed more persistence of effort as MA decreased.

194. JENKINS, Katherine Nessler. *The Relationship Between Participation in Physical Education Instruction and the Gross Motor Performance of Institutionalized Trainable Mentally Retarded Boys.* Master's thesis. Denton, Texas: Texas Woman's University, August 1968.

This study investigated values of physical education instruction as a means of improving gross motor performance of trainable mentally retarded boys (N=38; CA 9 to 14; IQ 20 to 50). Experimental and control groups were compared on Heath rail-walking, standing broad jump, 30-yard dash, and an original hopping test. The experimental group met for an hour a day, five days per week for seven weeks, and received both individual and group instruction; each period was divided into four segments with 10-12 minutes spent in walking, running, hopping, and jumping activities. Various behavior modification techniques and procedures were used. Differences among all pretest scores were nonsignificant; posttest scores showed significant improvement and differences favoring the experimental group in all but the 30-yard dash.

195. JENNINGS, Elizabeth Ann. *An Analysis of the Adjustment Problems of the Mentally Retarded with Implications for Physical Education.* Master's thesis. Los Angeles, California: University of California at Los Angeles, June 1958.

Through analysis of adjustment problems of secondary school (grades 7 to 12) educable mentally retarded girls (IQ 50 to 75) implications were drawn for formulating a physical education program to meet special needs of this

group. A descriptive method based on reporting practices of conditions was used to make recommendations for simple and functional programs geared to each child's level of intelligence. The author felt that the psychological basis for selecting and organizing activities was found in the students themselves. Sections dealt with: 1) physical, psychological, emotional, and social characteristics of mentally retarded persons; 2) educating and training retarded children; 3) principles of learning as applied to retarded persons; 4) applying basic goals of education to programs for mentally retarded children; 5) characteristics of good physical education programs; and 6) problems encountered among mentally retarded youngsters at the secondary school level. Implications of preceeding sections for physical education programs for retarded girls were delineated in terms of 1) program objectives and needs; 2) conducting programs; 3) methods of instruction; and 4) selecting activities.

196. JEWISH Foundation for Retarded Children. *Organized Therapeutic Exercises vs. Free Permissive Games and Exercises for Trainable Mentally Retarded Young Adults and Adults*. Washington, D.C.: The Foundation (now National Children's Center, 6200 Second Street, N.W.), n.d.

A program of planned, organized, individualized therapeutic exercises and activities was shown to be more effective in meeting needs of a group of young adult and adult trainable mentally handicapped subjects over a program of free permissive games and activities. The experimental group (CA 16 to 34; IQ 11 to 70) consisted of 16 male and ten female day care trainees at the Jewish Foundation for Retarded Children and five residents from a nearby residential facility. Subjects from the Jewish Foundation participated in the experimental program from September through March; those from the residential facility participated from December through March. The control group consisted of 22 male subjects (CA 20 to 41; IQ 26 to 40) from the same residential facility which provided subjects for the experimental group. These subjects participated from September through March in a program consisting of free permissive games and activities. Performances in physical fitness and motor proficiency were assed by the standard UNESCO Test of Physical Achievement (standing broad jump, sit-ups, 50-yard dash, pull-ups, shuttle run, right and left stork stand, flexibility stretcher) and a specially devised physical achievement test consisting of items (vertical jump, sit-ups, 30-yard dash, prone pull-ups, chair shuttle) similar but not idential to the UNESCO Battery. The UNESCO Test was given to both experimental and control groups before and after the experimental period; the special test was given both groups only at the end of the program to obtain performance

scores which minimized practice effects and other possible advantages of the experimental group. Special eye-hand coordination and undressing-dressing tests were given the experimental group at the beginning and end of the experimental period. Results of the UNESCO Test showed performances of day care trainees from the Jewish Foundation improved significantly in all items; five subjects from the nearby facility who participated with the experimental group for four months had significant improvement in five test items and positive trends in the other two. The control group had no significant improvement in any test item; performances of the control group actually regressed in two items while moderate but non-significant gains were noted in the others. Females of the experimental group had greater increments of improvement than any group of males, experimental or control. Comparisons of performances on the specially developed test of physical achievement reenforced results of the UNESCO Battery in that the experimental group had significantly better results than the control group on all items. Results of the eye-hand and undressing-dressing tests showed that the experimental group had improved significantly by the end of the program.

197. JENNY, John H. "Physical Education for the Mentally Retarded." Exceptional Children 23: 4: 146-148; January 1957.

This article emphasizes that learning has a physical base. Through application of motor reinforcement of a simple and enjoyable nature, good habit patterns in standing, sitting, moving, playing, and resting were established for mentally retarded children and youth. These contributions along with self-satisfaction that came from maintaining a sound body were unique values derived from physical education for retarded youngsters.

The author encouraged physical educators to incorporate the following exercises and activities in physical education programs for mentally retarded children: 1) prehensive movements, locomotion, and complex combinations of both; 2) Kraus-Weber Tests for strength and flexibility; 3) social learnings through dancing, music, crafts, collecting hobbies, and tramatic activities that could be carried over into recreation experiences, and, 4) aquatic activities.

198. JOHNSON, B. "Practice Effects in a Target Area: A Comparison of Groups of Varying Intelligence." Psychological Review 26: 300-311; November 1919.

The purpose of this investigation was to study effects of intelligence upon motor performances of persons with varying degrees of intelligence.

Ordahl and Ordahl, Covin, and Kuhlman all conducted tests in this area and found generally that above normal intelligence groups improved the most in motor ability. Woodrow made a similar study but concluded that with practice feeble-minded subjects improved as much as normal children and that there was no correlation between capacity to learn and capacity to grow.

Johnson conducted a study with women of three intelligence levels; he used a dart board and darts and recorded results over a period of time. He concluded that median and high groups had approximately the same initial ability and that the superior group was better with the right hand but not the left. With control subjects he found wide variability in low and high groups while the median group followed the expected learning curve.

199. JOHNSON, G. O. and R. J. Capobienco. "Physical Condition and its Effects Upon Learning in Trainable Mentally Deficient Children." Exceptional Children 26: 1: 3-5; September 1959.

This study was designed to measure growth of 27 trainable mentally deficient children over a period of two years and to determine influence of improvement in general physical condition on intelligence and achievement. Visual and auditory acuity and a complete pediatric examination were used as bases for assigning children to groups. The good group was in good physical condition with no deformity or disease; fair subjects were in good physical condition with impaired hearing or vision problems, colds, rhinitis, strabismus, or minor deformities; the poor group included mongoloids and nonmongoloids with major deformities or diseases such as epilepsy or heart disease. Vineland Social Maturity Scale, Fels Child Behavior Rating Scale, and a modified behavior check list were used for testing and determining differences among groups. Results showed no significant differences in degree of improvement among the three groups due to class training.

200. JOHNSON, Orville and Kathryn Blake. *Learning Performance of Retarded and Normal Children.* Syracuse, New York: Syracuse University Press, 1960.

The specific purpose of five separate but related studies comprising this investigation was to examine relative status of intellectually retarded and normal subjects (similar in terms of mental age) as they performed in situations designed to involve direct learning, retention of learning, and transfer of learning. Mean times of retarded subjects on both puzzle assembly and card sorting tasks were significantly

lower than those of normal subjects. There were no differences between the two groups in terms of mean performances on a serial nonsense syllable task. On a paired associate nonsense syllable task, normal subjects tended to perform significantly better than retarded subjects. Conversely, on a paired-associate letter-digit substitution task, retarded subjects had significantly higher mean scores than normal subjects. No significant differences were found between mean performances of the two groups on reasoning tasks. There was sufficient evidence to conclude that in relatively short-term learning situations comparable to those utilized in these studies, intellectually retarded and normal subjects who had equivalent mental ages did not differ in terms of rate for direct learning. It was difficult to propose a generalization about the relative transfer of learning performance of the two groups.

201. JOHNSON, W. R., B. R. Frentz and Julia A. Johnson. "Changes in Self-Concepts During a Physical Education Program." Research Quarterly 39: 3: 560-565; October 1968.

In this study researchers tried to determine whether participation in a physical developmental clinic program 1) reduced discrepancies between self and self-ideal concepts in handicapped children, 2) increased willingness to be with large numbers of children, 3) increased willingness to be near a clinician, and, 4) increased desire to be near a father or authority figure. Subjects (N=74, male 63, female 11; CA 4 to 17, $\bar{X}$ 9; emotionally disturbed 28 mentally retarded 31 brain damaged 15) attended the clinic two days a week, one to two hours a day for six weeks. The program consisted of systematic play-oriented neuromotor-perceptual training in gymnasium and swimming pool; child and clinician were on a one-to-one relationship. Pre and posttest evaluations of self concepts were based on children's responses to specific drawings and figures in which they were asked to select drawings that represented them and those which they would like to be. Participation in the program led to 1) a decrease in the self--self-ideal discrepancy in height, and 2) an increase in willingness to be with large groups of children, a clinician, or a father or authority figure. No significant changes occurred with respect to self--self-ideal discrepancies in weight, arm length, and leg length.

202. JONES, H. E. "Relationships in Physical and Mental Measurement." Review of Educational Research 9: 1: 91-102; February 1939.

In this article results and findings of studies dealing with interrelations of mental abilities and specific physical charac-

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teristics were reviewed. Evidence from studies on related changes in growth curves, body build, intelligence and cranial measurements, physical abilities and condition, influence of month of birth and month of observation, with rank, mental deficiency, height and weight had established positive correlations between intelligence of children and various measures of physical development.

203. JUDELSOHN, Samuel J. "A Study of the Physical Ability of Mentally Retarded Children." Mind and Body 31: 296-311; 1924.

Performances of mentally retarded boys and girls enrolled in special class concentration centers were compared with performances of normal boys and girls. Both groups participated daily in 30 minutes of physical training activities; ten minutes of each session were devoted to track and field work. Records of 1,524 mentally retarded boys and 638 mentally retarded girls were kept during the school year and included height, weight, standing broad jump, overhand ball throw, 50-yard dash, chinning for boys and knee raising for girls. Comparisons were made with normal children with data collected under similar conditions which included: 1) playroom or gym with satisfactory equipment, 2) sufficient time allotment, 3) teachers of approximately the same ability, and, 4) class size of 20 to 24 for special education and 45 to 55 for normal classes. Analyses showed: 1) chronological age as the best basis upon which to establish aims in track and field events, 2) mentally retarded boys shorter and lighter than normal boys, 3) mentally retarded girls shorter at all ages, lighter at ages 9 to 12 and about the same weight at ages 13 to 15, 4) mentally retarded boys jumped farther, threw farther, and ran faster than mentally retarded girls, 5) in all four track and field events mentally retarded boys were from one and one-half to three years poorer in average performance than normal boys, 6) mentally retarded girls were from two to seven years poorer in average performance than normal girls, 7) ability in track and field events could be taken into consideration as one index of the physical age of children, and, 8) track and field standards could be set within reach of mentally retarded children.

204. JURCISIN, George. "Dynamics of the Doman-Delacato Creeping-Crawling Techniques for the Brain-Damaged Child." American Corrective Therapy Journal 22: 5: 161-164; September/October 1968.

This study described the Institutes for the Achievement of Human Potential which were established to aid severely brain damaged children. The basic premise espoused by Institute founders was based on the belief that even the severely injured

brain cells remaining intact could be activated to take over functions of dead or damaged cells. The Developmental Profile was based on neurological development levels of control which paralleled biogenetic evolution of man. The author believes that reasons for improvement obtained through the program have not been determined. Improvement could be due to love and attention concentrated on a child during the rigorous program or by the objective soundness of the Developmental Profile. He feels the following have significant values for education: 1) ability to screen out problem children in kindergarten and first grades, 2) remedial exercise program presented by the school and then by the parent, and 3) periodic and constant reevaluations.

205. KALAKIAN, Leonard H. *Predicting Academic Achievement from Perceptual-Motor Efficiency in Educable Mentally Retarded Children.* Doctoral dissertation. Salt Lake City, Utah: University of Utah, August 1971.

This study purported to investigate relationships among perceptual-motor efficiency (Purdue Perceptual-Motor Survey PPMS) and academic achievement (reading and arithmetic subtests of California Achievement Test) for educable mentally retarded youngsters (N=20; MA 7-0 to 8-9). A related purpose was to develop an abridged form of the PPMS. Factors were analyzed in terms of various correlations and regression approaches to predict academic achievement from perceptual-motor efficiency. Since seven significant correlations (r=.44 to .66) existed between perceptual-motor efficiency and academic achievement, it was concluded that certain measures of perceptual-motor efficiency were helpful in predicting academic achievement with varying degrees of accuracy. Certain PPMS items tended to measure common perceptual motor characteristics and could possibly be eliminated from the present battery. The fact that perceptual-motor efficiency measures did not more accurately predict academic achievement suggested 1) perceptual-motor efficiency was but one of many factors which influenced academic achievement, 2) perceptual-motor efficiency was more or less important in academic achievement depending upon age or achievement levels, and 3) academic achievement as measured in this investigation required forms or levels of perceptual-motor efficiency not measured by PPMS.

206. KEITH, Charles A. *The Effect of Swimming Upon Self-Concept and Selected Motor Fitness Components in Educable Mentally Retarded Children.* Doctoral dissertation. Hattiesburg, Mississippi: University of Southern Mississippi, 1972.

This study was designed to increase the scope of knowledge regarding effects of participating in a swimming program upon

self-concept and selected motor fitness components of educable mentally retarded males. Subjects (N=29; CA 10 to 21; IQ 50 to 75) were selected at random from EMR students at a state school. They were given the Tennessee Self-Concept Scale and eight motor fitness tests designed to measure 14 physical factors including agility, balance, cardiorespiratory endurance, sprint speed, power, reaction time, speed of hand movement, and strength; tests were administered immediately before and just after participating in an eight-week swimming program, five days a week, 50 minutes a day.

Findings indicated: 1) no significant differences between pre and posttest scores on the Tennessee Self-Concept Scale, 2) significant differences between pre and posttest motor fitness scores on ten of the 14 physical factors, and, 3) no significant correlations between items of the Tennessee Self-Concept Scale and motor fitness items on either pre or posttest.

207. KEOGH, Barbara K. and Jack F. Keogh. "Pattern Copying and Pattern Walking Performance of Normal and Educationally Subnormal Boys." American Journal of Mental Deficiency 71: 1009-1013, 1967.

Performances of 39 educationally subnormal boys (CA 9 to 10) were compared with those of 84 normal school boys (CA 6 to 9) on ability to copy four simple line patterns by drawing and walking. Performances of ESN subjects were similar to those of normal six year olds on both tasks, and were significantly poorer to those of normal boys in all other age groups. There were no differences between walking and drawing abilities of normal boys but ESN subjects were significantly less skilled in walking patterns than they were in drawing the same patterns. Objective scores and subjective observations of performances suggested that ESN boys had extreme difficulty in organizing their gross movements to represent patterns in a larger spatial field.

208. KEOGH, Jack. *Incidence and Severity of Awkwardness Among Regular School and Educationally Subnormal Boys."* Los Angeles, California: University of California at Los Angeles (Department of Physical Education), 1966.

Educationally subnormal and normal boys were tested to determine whether ESN subjects were more awkward than normal boys. Subjects (N=98 Caucasian school boys; ESN N=40, CA 9 to 10, IQ 51 to 77; normal group, N=58, CA 9 to 11) had no physical limitations and were tested individually in six activities: beam balance, beam walk, 50-foot hop, standing broad jump, alternate foot hopping,

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and simultaneous foot-finger tapping. Results indicated that 1) ESN boys were less able physically than normal boys and 2) one-half of ESN boys were awkward compared with one-fifth of normal boys.

209. KEOGH, Jack and James N. Oliver. "A Clinical Study of Physically Awkward ESN Boys." Research Quarterly 39: 2: 301-307; May 1968.

This study was designed to observe severely awkward educationally subnormal Caucasian boys (CA 9.0 to 10.0; IQ 51 to 73) as they demonstrated physical skills involved in six activities--beam balance, beam walk, 50-foot hop, standing broad jump, alternate foot hopping, and simultaneous foot-finger tapping. Seven boys achieved some measure of success. The researchers noted such deficiencies as 1) slowness and deliberateness when moving, 2) lack of control of force and speed, 3) inability to perform a prescribed rhythmical count, and 4) inability to perform with one side of the body. Observed performance difficulties were related to tasks and to problems of initial learning rather than to physical characteristics of the boys.

210. KEOGH, Jack F. and James N. Oliver. "Physical Performance of Retarded Children: Diagnosis and Prescription." Expanding Concepts in Mental Retardation (George A. Jervis, Editor). Springfield, Illinois: Charles C. Thomas Publisher, 1968. pp. 227-231.

Physically clumsy mentally retarded boys were observed as they tried to perform and learn a variety of activities and skills involving rhythmical use of limbs. Subjects (N=17; CA 9 to 10; IQ 51 to 77) were selected from a large group for individualized instruction to help them improve rhythmical use of limbs. Each boy had four to six lessons lasting from 10 to 12 minutes. During instruction sessions several performance difficulties were noticed: 1) deliberate halting, and hesitating movements, 2) inconsistencies in which tasks were sometimes performed correctly on one side of the body and not on the other, 3) interference of leg and arm movements, 4) inability to perform and maintain movements in a rhythmical pattern, 5) little or no response at all, 6) inability to achieve in restricted areas, and 7) lack of self confidence. Despite these observations of performance difficulties, there was no proof that they were related to each other. Some performance difficulties may have been related to the task and others to the child himself.

211. KERSHNER, John R. *"An Investigation of the Doman-Delacato Theory of Neurological Organization as it Applies to Train-*

ables in the Public Schools." Harrisburg, Pennsylvania: Department of Public Instruction (Division of Cooperative Research Studies, Bureau of Administration and Coordination), May 1967. Article, "An Investigation of the Doman-Delacato Theory of Neurological Organization as It Applies to Trainables in the Public Schools," in Exceptional Children 34: 6: 441-449; February 1968.

This study was designed to determine effects of a four-month program of physical activities consistent with the Doman-Delacato theory of neurological organization on physical and intellectual development of trainable mentally retarded children. Pre and posttests measured crawling and creeping ability (48-point scale), motor development (adaption of Oseretsky tests), and intelligence (Peabody Picture Vocabulary Test) of two classes of trainable youngsters (experimental group N=13, CA 8 to 18; control group N=16, CA 8 to 17). Both groups made significant gains in motor development; only the experimental group showed significant gains in mobility and intellectual proficiency.

212. KERSHNER, John R. "Lateral Preference and Ability to Conserve Multiple Spatial Relations by Mentally Retarded Children." Perceptual and Motor Skills 35: 151-152; 1972.

Thirty-one trainable mentally retarded children (17 boys, 14 girls; IQ 34 to 55, $\bar{X}$ 42; CA 8 to 10, $\bar{X}$ 9) were divided into lateralized (N=16) and mixed-dominant (N=15) groups (KDK Kershner-Dusewicz-Kershner) and then tested on ability to perform a spatial task requiring short-term memory and reversible visual imagery. Retarded children with inconsistent and crossed laterality patterns performed significantly better in visual-spatial ability than retarded children whose sided preferences were unilateral in eye, hand, ear, and foot. Results supported the developmental importance of bilateral sensory and motor functioning.

213. KIDDER, Gene and Norvin L. Landskov. *An Exploratory Study of the Value of a Special Physical Education Program for Three Groups of Special Education Students in Meridian, Mississippi.* Meridian, Mississippi: Meridian Public Schools, n.d.

Values of a special physical education program for three groups of mentally retarded students were investigated. Groups consisted of: 1) educable children (N=19; CA 7 to 13; IQ 50 to 80), 2) trainable youngsters (N=10; CA 7 to 14; IQ 35 to 55), and, 3) control subjects (N=18; CA 16 to 19; IQ 50 to 80). Educable and trainable groups participated for one semester approximately 17 weeks in a special physical education program which included developmental exercises, low organized individual activi-

ties, chasing and fleeing games, stunts and combative activities, squad games and relays, rhythms, simple lead-up games, and sports. The control group took part in the regular physical education program used in Meridian public schools. The Oseretsky Test of Motor Proficiency and selected portions of the Peabody Physical Fitness Tests were given prior to and at the conclusion of the program. General findings included: 1) the regular physical education pro gram for 17 weeks had little or no measurable effect on these students, 2) improvement in motor proficiency as measured by the Oseretsky Motor Proficiency Test appeared to be negligible regardless of program, 3) younger special education students, especially EMR's improved in levels of physical fitness after taking part in the special program, 4) individual differences were pronounced within special education groups--not only were measures of variability high but case records indicated many and varied physical disabilities suggesting use of case method procedures for judging effectiveness of special education programs, and 5) special physical education programs for mentally retarded and/or physically handicapped children were defended on philosohical grounds.

214. KILLINGER, Delight. *A Study of the Effect of Intensifying the Emphasis on Physical Fitness in a Class of Educable Retarded Girls and of Normal Eighth Grade Girls in Physical Education.* Master's thesis. Iowa City, Iowa: University of Iowa, June 1963.

This study was designed to compare effects of an intensified physical fitness program on educable mentally retarded girls (N=13; CA 12 to 16; IQ 50 to 79) and on normal girls at the eighth grade level (N=30; CA 13; low to average mental ability). All classes participated in essentially the same activities--exercises, soccer, tennis, deck tennis, volleyball, basketball, trampoline, tumbling, recreational game softball, track, and dance--although they were simplified for mentally retarded girls so as to include only fundamental skills and most basic understandings. Students in regular classes met two or three times a week while special classes met three times a week; activity portions of most classes ran for 30 to 35 minutes throughout the school year. Comparisons of September and May performances on the Iowa Test of Motor Fitness (shuttle run, bent-arm hang, sit-ups, standing broad jump, forward bend, grasshopper, and 50-yard dash) were used to evaluate progress. Mentally retarded girls showed some improvement on each of the test items (flexibility, endurance, and speed were significant); students in regular class improved in all test items except shuttle run (leg strength and coordination, flexibility, and arm strength were significant). It was noted that retarded girls voluntarily pursued a diet and weight control program,

showed a wholesome spirit of competition, and were better able to solve personality clashes. There appeared to be little change of status among peers, especially of the retarded girls, during the course of the year. It was concluded that a continuing emphasis on fitness for *all* students was necessary for them to maintain high levels of total fitness.

215. KIRBY, Janet K. *Motor Learning and Performance in Mentally Retarded Children as Related to Age and Sex.* Master's thesis. Berkeley, California: University of California, 1969.

A stabilometer was used to test learning ability of mentally retarded children (N=52; CA 7 to 16). There were no significant differences in initial scores as functions of either age or sex. Significant differences occurred in learning scores as a function of age with children 11 1/2 to 16 years of age learning more than those 7 to 11 1/2 years of age; the older group showed significant learning whereas the younger group did not. Children tended to maintain the same relative position throughout testing and those with better initial scores tended to learn the most.

216. KLAUSMEIER, Herbert J., Irvin J. Lehmann, and Allan Beeman. "Relationships Among Physical, Mental, and Achievement Measures in Children of Low, Average and High Intelligence." American Journal of Mental Deficiency 63: 647-656; 1959.

This study was designed to test the following hypotheses: 1) low level of physical development was accompanied by low achievement in arithmetic and reading, 2) uneven physical development within a child was accompanied by low achievement in arithmetic and reading, and 3) within-child variability in grip strength, intelligence, reading achievement, and arithmetic achievement was the same among children of low, average, and high intelligence. Intelligence was measured by the Wechsler Intelligence Scale for Children; physical measures included height, weight, grip strength, number of permanent teeth, and bone development in the right hand and wrist.

As a result of the findings, researchers confirmed hypothesis 1, rejected hypothesis 2, and initially rejected hypothesis 3, but later confirmed it after further testing.

217. KLEPPINGER, Claudia Jane. *The Influence of a Physical Education Program on the Illnesses and Accidents of Mentally Retarded Students.* Master's thesis. Austin, Texas: University of Texas, 1970.

The purpose of this study was to determine effects of participation in physical education activities on illness and accidents

of mentally retarded students (N=223) enrolled in a state school. A significant decrease in total frequency of illness for both boys and girls was found. However, there was a significant increase in the total number of accidents for boys; students with extremely low motor ability had more accidents than expected.

218. KOPP, Helene. "Oseretsky Tests." American Journal of Ortho-Psychology 16: 114-119; 1946.

This study was undertaken to analyze Oseretsky Tests of Motor Development (static coordination, dynamic coordination of hands, general dynamic coordination, speed, associated movements, synkinetic movements). Each test item was demonstrated by the experimenter to insure full understanding of instructions given; a practice period included two or three trials of each item for all subjects. It took 45 minutes to an hour to test a child of 12; older children required a longer period of time since the test included more items and was more complex; less time was needed to test younger children. Although this scale for children four to 16 years of age, had been standarized for French children but not for American children, it was used in this study. Since rigid research procedures for observing a subject while he performed a test item were necessary to make notations of minute details of motor behavior, clinical training and experience were considered important and required of testers. Oseretsky had established four categories for motor deficits: 1) retardation of 1 to 1 1/2 years--slight retardation, 2) 1 1/2 to 3 years--motor deficiency, 3) 3 to 5 years--severe motor retardation, and, 4) more than 5 years--motor idiot. An investigation of motor development and function of 50 stuttering children revealed marked disturbances of their motor function. Certain individuals did not show signs of motor retardation as their motor ages corresponded to their chronological ages. However, analyses of scores showed global, uniform deficiencies in maturity of the extra pyramidal system as seen in failures in tests of synkinetic movements, mimic, rhythm, and coordination.

220. KOZAR, Bill. "The Effects of Motor Performance of Setting An Overt Level of Aspiration By Mentally Retarded Students." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.

Effects of setting an overt level of aspiration (OLA) for standing long jump performances of mentally retarded students (N=40) were investigated. Based on research findings with students of normal IQ it was hypothesized that mentally re-

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tarded students setting an OLA would strive for a clearly committed observable goal and their performances would be superior to mentally retarded students not setting OLAs. Mildly and moderately retarded students were randomly assigned to one of two groups--OLA or control group. All students were given six standing long jump trials with from 60 to 120 seconds rest between trials. A long jump mat was clearly marked in feet and inches with lines and numbers on both sides. Members in the control group were simply asked to jump as far as they could on each trial. Subjects in the OLA group were asked before each trial to point to a line on the mat where they expected to jump on the next trial. The study revealed that no significant differences existed between groups in standing long jump performances. Results further indicated that subjects in the OLA group failed to lower their discrepancy scores significantly from trial to trail.

221. KRAMER, Peter G. *Developmental Trends of Selected Performance Items in Mongoloid Males.* Master's thesis. Springfield, Massachusetts: Springfield College, August 1969.

This study examined performances on selected motor tasks on institutionalized mongoloid males (N=38; IQ 30 to 50), and compared them with performances of normal (N=43; CA 10 to 30) controls. Participants were measured for reflex time (patellar tendon reflex), reaction time (Creighton Hale Reaction Analyzer), performance time (Creighton Hale Reaction Analyzer with two keys), and grip strength (Smedly Hand Dynamometer). Results revealed: 1) no differences between reflex times of mongoloid and normal subjects, 2) performances of mongoloid subjects inferior to those of normal subjects in reaction time, performance time, and strength, 3) normal subjects showed developmental changes in reaction time and grip strength with continued improvement throughout the age range of 10 to 30 years and with less improvement after 20 years of age, 4) mongoloid subjects showed developmental changes in performance time and grip strength but responses did not continue to improve throughout the period of 10 to 30 years of age, and 5) mongoloid subjects were generally incapable of making rapid, conscious responses.

222. KREZZER, George. "Motor Studies of the Mentally Deficient, Quantitative Methods at Various Levels of Integration." Training School Bulletin 32: 7: 125-135; November 1935.

The author discusses a series of studies designed to investigate motor functions of crippled birth-injured subjects at a state school. The first study made comparisons between mentally normal and feeble-minded subjects in extent of movement at various joints; results showed that feeble-minded subjects tended to fall

below normal persons in amplitude of practically all passive and voluntary movements examined. In a large number of these movements differences were significant; for one particular joint movement, flexion at the knee, distributions of measures for the two groups were completely exclusive. Other findings indicated: 1) passive movements were affected by differences in degrees of tonus of stretched muscles and state of tension of ligaments, and 2) voluntary movements were affected by effort exerted by a subject and strength of muscles involved. A second study dealing with differences in excitability of muscles of mentally normal and mentally deficient subjects indicated that chronaxy measures could be used as indicators of brain conditions associated with defective intelligence; various factors that influenced motor chronaxies could be controlled. Results suggested that the higher level of chronaxy found for the low-grade feeble-minded group was due to developmental defects in the brain.

223. KREEER, George and Katherine Bradway. "Relation Between Binet Mental Age and Motor Chronaxia." Archives of Neurology and Psychiatry 34: 6: 1149-1171; December 1935.

This study was designed to determine whether measurements of chronaxia were valid indicators of conditions in the brain associated with intellectual or cognitive performances. Specifically, the researchers sought to determine relationships between various chronaxic measures and levels of intelligence (Binet Tests). Subjects (N=50 males; CA 17 and over) were distributed equally into Binet mental age groups of three, six, nine, 12, and 15. Indicies for 1) levels of chronazia at the motor points of certain muscles--biceps, brachialis, lateral head of triceps, 2) relationships of chronaxias of motor points of antagonistic muscles, and 3) range of fluctuation of chronaxias for individual subjects were all examined. No reliable correlations between any of these indicies and mental age were found. A reliable difference was noted between average level of chronaxia of subjects with a mental age of three years and normal subjects for motor points on the triceps muscle; this relationship was not observed for other motor points, other chronaxic indicies, or other mental ages.

224. KUGEL, R. B. and J. Mohr. "Mental Retardation and Physical Growth." American Journal of Mental Deficiency 68: 41-48; July 1963.

This investigation dealth with relationships 1) between degree of mental retardation and physical growth (height and weight records using Iowa Growth Charts) and 2) between etiological factors of mental retardation and physical growth for

815 subjects two days through 16 years of age. Findings supported conclusions that 1) degree of mental retardation and degree of physical growth deficiency were related, 2) greater the mental defect, the more retarded the physical growth, and 3) degree of physical retardation was related to cause of mental retardation.

225. KULCINSKI, L. E. "The Relation of Intelligence to the Learning of Fundamental Muscular Skills." Research Quarterly, December 1945. pp. 266-276.

This study investigated existing relationships between intelligence and ability to learn fundamental muscular skills of a tumbling or stunt nature. Fifth and sixth grade boys and girls (N=105; IQ 41 to 125) were given easy and difficult batteries of physical performance tests. Data showed a highly positive relationship existed between various degrees of the intelligence of these fifth and sixth grade boys and girls and their ability to learn measurable fundamental muscular skills. Subjects of superior and normal intelligence scored significantly above those in the subnormal group on the difficult battery of tests.

226. KUNIS, Robert Arthur. *A Comparison of the Physical Fitness of Educable Mentally Retarded Boys and Non-Retarded Boys Between the Ages of Eleven and Fourteen.* Master's thesis. Knoxville, Tennessee: University of Tennessee, August 1966.

This study purported to determine differences in physical fitness (AAHPER Youth Fitness Test) between educable mentally retarded (N=32; CA 11 to 14) and non-retarded boys (N=32, 5th to 8th graders) in the same chronological age range. Non retarded boys performed significantly better than retarded subjects on five of the seven test items (sit-ups, shuttle run, standing broad jump, softball throw, and 600-yard run-walk); non-retarded subjects also surpassed retarded boys in pull-up and 50-yard dash performances although not significantly. The investigator felt that EMR boys lacked incentive and motivation during testing sessions and were not finding opportunities to participate in physical education activities; there was great need to provide physical education facilities for and staff attention to mentally retarded students.

227. LAFFOON, Wilma Lucille. *A Comparison of Flexibility in Mongoloid, Other Mentally Retarded, and Normal Children.* Master's thesis. Conway, Arkansas: Hendrix College, July 1968.

This study was designed to determine differences in extent flexibility (toe touch, twist and touch, abdominal stretch,

spinal extension) existed among mongoloid, other types of mentally retarded, and normal children. Subjects (girls 20, CA 11 to 18, mongoloid 10, IQ 16 to 35; other retarded 10, IQ 15 to 39; boys 20, CA 11 to 21; mongoloid 10, IQ 13 to 23; other retarded 10, IQ 19 to 50) from a state residential school were matched according to CA and sex with children from a private school, and with those from from a residential facility in another state. (24 girls, CA 7 to 18, mongoloid 12, IQ 17 to 59; other retarded 12, IQ 30 to 69; boys 18, CA 8 to 19; mongoloid 9, IQ 20 to 49; other retarded 9, IQ 18 to 72). Overall results showed: 1) mongoloid girls significantly superior to other retarded girls in toe touch and twist and touch, 2) mongoloid boys significantly superior to other retarded boys in spinal extension, and 3) retarded boys superior to mongoloid subjects on abdominal stretch. At the facility in the other state: 1) mongoloid girls were significantly superior to other retarded girls on toe touch and twist touch, 2) spinal extension, and, 3) other retarded boys significantly superior to mongoloid boys on abdominal stretch. Generally, results favored mongoloids over normal comparisons although only differences in the toe touch were significant. No significant differences were found among mongoloid and normal boys, mentally retarded and normal girls, and mentally retarded and normal boys. The question was raised as to why mongoloids tended to be more flexible than the other groups--perhaps irregular body builds, laxness of joint ligaments, or some unidentified reasons were responsible.

228. LANDIS, Marcia M. *The Relationship of Improvement in Dynamic Balance to Motivational and Nonmotivational Balance Beam Training, Intelligence, and Sex in Severely Retarded Children.* Master's thesis. Amherst, Massachusetts: University of Massachusetts, 1971.

Effects of using auditory and visual motivational cues on balance beam performances of severely retarded boys and girls were studied. Subjects, (N=20; CA 7 to 10) were divided into two groups of ten each. Both groups spent 30 minutes a day, four days a week for eight weeks working on a balance beam. One group was trained in dynamic balance on a balance beam providing auditory and visual motivational cues; the other group was trained on the same beam without the motivational cues. All subjects were pretested in dynamic balance and were retested after every second week of training on the balance beam without auditory and visual stimuli. A trend analysis revealed no significant difference in performance trends under motivational and nonmotivational conditions. Correlations between IQ and improvement in dynamic balance were not significant in either group. In comparing low IQ subjects to high IQ subjects, trend

analysis revealed that overall main effect between group mean performances was significant although the difference in trends was not significant. A trend analysis comparing male and female improvement in dynamic balance resulted in a nonsignificant difference.

229. LANGAN, James Gregory. *A Comparison of Motor Proficiency in Middle and Lower Class Educable Mentally Retarded Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, August 1965.

This study compared motor proficiency (Lincoln-Oseretsky Motor Development Scale) of middle and lower social class educable mentally retarded children to performances of children with normal intelligence of similar chronological age and sex. Subjects (N=96; boys 48, girls 48) were students enrolled in primary and intermediate grade public school special classes. Major findings for subjects of the same sex and of similar chronological ages indicated: 1) no significant differences in motor proficiency between middle and lower class educable mentally retarded children, 2) highly significant differences between retarded children and children or normal intelligence, 3) significant differences in motor proficiency among eight, nine, and ten year old retarded subjects, 4) relationships were linear in nature, 5) motor proficiency of retarded boys and girls tended to follow normal developmental curve, and 6) relationships between chronological age and motor proficiency.

230. LASSNER, R. "Annotated Bibliography on the Oseretsky Tests of Motor Proficiency." Journal of Consulting Psychology 12: 1: 37-47; January/February 1948.

This is an annotated bibliography dealing with the Oseretsky tests of motor proficiency which at time of this publication (1948) had not been standardized with or for an American population.

231. LEE, Sandra S. *The Effect of Audiovisual Aids on Teaching Specific Sports Skill to the Educable Mentally Retarded.* Master's thesis. Gainesville, Florida: University of Florida, 1966.

In this study effects of using audiovisual aids to teach volleyball skills to educable mentally retarded boys and girls were investigated. Subjects (N=22) were divided into control and experimental groups. The control group was taught using traditional methods while the experimental group was taught using audiovisual aids. Scores on wall volley and underhand serve tests were measured by a modification of the Russell-

Lange version of the French-Cooper Volleyball Test for junior high school students. Analyses of data showed no significant differences between pre and posttest scores for either group.

232. LEHMAN, Jean. *Visual Perception and Information Processing in Cerebral Palsied as Contrasted with Normal and Mentally Retarded Children.* Master's thesis. Toledo, Ohio: University of Toledo, 1971.

Twenty-eight cerebral palsied, 19 mentally retarded, and 30 normal subjects were tested for performance in four components of visual perception (figure-ground relationships, form constancy, spatial positions, spatial relationships) and reaction time to light and auditory stimuli. All components of visual perception were found to be impaired in cerebral palsied subjects and independent in normal and mentally retarded subjects. Cerebral palsied subjects had lower reaction times than other subjects; it was suggested that this difference was due to impairments in information processing ability.

233. LEIGHTON, Jack R., Marion Cupp, Alfred J. Prince, Donald E. Philabaum and George L. McLarren. "The Effect of a Physical Fitness Developmental Program on Self-Concept, Mental Age and Job Proficiency in the Mentally Retarded." Journal of Physical and Mental Rehabilitation 20: 1: 4-11; 1966.

Effects of a physical fitness program containing strength, endurance, coordination, and socialization activities on self-concept, mental age and job proficiency of mentally retarded subjects were studied. Roger's Strength Test, Brouha Step Test, and Leighton Flexibility Test were used to measure specific aspects of physical fitness. Improvements were noted only in endurance and flexion-extension. Several psychological tests including the Peabody Picture Vocabulary Test were also administered to the subjects. At the conclusion of the program, subjects seemed more competitive, more willing to give and take, and more likely to laugh.

234. LEITE de COSTA, Maria Irene. "The Oseretsky Tests--Method, Value and Results." The Training School Bulletin 43: 1:2:3: 4: March, April, May, and June 1946.

These articles describe the Oseretsky Tests of Motor Development according to chronological age levels four through 16. Tests include six groups of motor tasks for each chronological age level. Methods of calculating motor age and motor acceleration are explained; relationships between motor ability and intelligence are also discussed.

235. LELAND, H., J. Walker, and A. N. Taboada. "Group Play Therapy with a Group of Post-Nursery Male Retardates." American Journal of Mental Deficiency 63: 848-851; 1959.

The purpose of this study was to determine effects of group play therapy upon eight mentally retarded post-nursery boys with behavior problems. Subjects (CA 4-9 to 9-6) were pre and posttested with the Wechsler Intelligence Scale and Vineland Social Maturity Scale. About 90 hours of therapy were given. Data showed no major changes in levels of social maturity. Although the experience did activate some intellectual potential which had not been evident before the experiment.

236. LIESE, James E. and Harold A. Lerch. "The Relationship Between Physical Fitness and Intelligence in Trainable Mental Retardates." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973. (Article, Mental Retardation. October 1974.)

In this study, the researchers sought to determine relationships between intelligence (Stanford Binet) and physical fitness (AAHPER Youth Fitness, and Fleishman Basic Fitness Tests) in high school age trainable mentally retarded males. A correlation matrix was devised and coefficients were checked for significance. Findings tended to support the tenet that fitness and intelligence were significantly related.

237. LIEMOHN, Wendell P. "The Relationship of Selected Developmental Variables in EMR Children." *Abstract of Research Papers, 1973 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1973.

Purpose of this study was to determine relationships between selected 1) gross motor (Cratty Gross Motor Test and selected items from the AAHPER-Kennedy Foundation Special Fitness Test), 2) cognitive/fine motor (Wechsler Intelligence Scale for Children and Developmental Test of Visual-Motor Integration), and, 3) behavior/social variables (DTC Behavior Checklist and the Vineland Social Maturity Scale) in educable mentally retarded children (N=48, boys 33, girls 15, CA 6 to 12). Because some children were in residence for as short a period as two weeks, and because of continual modification of the testing program, approximately one half of all children were evaluated on 1) all of behavior/social variables and IQ; 2) a minimum of 75 percent of all children were evaluated on all fine and gross motor variables. In addition to being retarded, many of the children had behavior disorders. Results indicated: 1) many high intra-correlations within each group of variables, 2) significant inter-

correlations between several gross motor items and cognitive/fine motor items, and 3) a few relationships between the two motor categories and behavior/social items. It appeared that EMR children in this study had relatively high relationships between certain gross motor and cognitive/fine motor abilities. Indications suggested relationships between behavior/social variables and motor ability.

238. LILLIE, David L. *The Effects of Motor Development Lessons on the Motor Proficiency of Pre-School Culturally Deprived Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, September 1966.

Effects of a diagnostically based motor development program on the motor proficiency of preschool mentally retarded, culturally deprived children (N=43; CA 4-9 to 5-10; IQ 50 to 85) from low and low-low socio-economic levels were investigated. Subjects were divided into three groups: 1) experimental preschool (EPS) which received motor development lessons; 2) kindergarten control (KC) which received a general kindergarten program; and, 3) home control (HC) which received no special program or attention. The Lincoln-Oseretsky Motor Development Scale was used to measure motor proficiency. Gross and fine motor performance scores were obtained by catorizing each test item on the basis of previously conducted studies in which motor development tasks had been factor analyzed. Important findings included: 1) diagnostically based motor development lessons devised for this study appeared to have a facilitating effect on the development of fine motor proficiency of subjects, 2) motor development lessons devised for this investigation plus an organized physical education program were no more effective in facilitating gross motor proficiency than motor activities engaged in at home or in regular kindergarten, and 3) investigation of gross motor and fine motor proficiencies as separate entities appeared to have more value for diagnostic remediation of motor deficiencies than investigation of total motor proficiency.

239. LITTLE, Harry Allan. *Perceptual-Motor Characteristics of Educable Mentally Retarded Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, June 1964.

This study was designed to determine perceptual-motor characteristics (Purdue Perceptual-Motor Survey) of educable mentally retarded children (N=103, boys 58, girls 45; IQ 50 to 79; CA 7 to 10 1/2) in six special primary classes--three in middle class neighborhoods and three from inner city culturally deprived neighborhoods. Data compared with normative results of non-retarded children indicated that the PPMS did not appear to

differentiate between normal and EMR children; EMR and normal children of similar chronological ages were found quite similar in terms of perceptual-motor characteristics, thus suggesting that intelligence and perceptual-motor abilities were not related. Perceptual-motor ability improved in both normal and MR groups as youngsters grew older. Additional findings included: 1) no differences between performances of EMR boys and girls; 2) no differences between EMR from middle class and culturally disadvantaged areas of the city; 3) no differences between total perceptual-motor scores and mean sociometric scores obtained from each student's own class; and 4) significant differences favoring normative data were found in 21 of 30 subtests. Perceptual-motor development and mental retardation did not appear to be directly related.

240. LOEWENDAHL, Evelyn. "Exploring Basic Motor Activities in the Mentally Retarded." American Corrective Therapy Journal 22: 5: 152-156; September/October 1968.

A program involving physical improvement and changes in emotional growth and development was studied through clinical observations. Three brain damaged mentally retarded females (CA 10, 12, 13; IQ 51 to 58) were evaluated by Gesell patterns, Delacarte scales, Kraus-Weber postural adequacy, and Billick-Loewendahl flexibility range. Results showed an increase in self-esteem, satisfaction, communication ability, group participation, attention, and release of tension and emotions. It was concluded that emotional and comprehansive growth took place with physical improvement in these mentally retarded girls.

241. LOEWENDAHL, Evelyn, and Thomas W. Richards. "A Therapeutic Approach to Adolescents." Journal of the Association for Physical and Mental Rehabilitation. 20: 2: 64-66; March/April 1966.

In this study an outpatient clinic approach using short term emphasis upon individually tailored programs to meet specific needs was used. It was found that improvement of physical appearance resulted in improvement of self-concept in adolescent subjects.

242. LOEWENDAHL, Evelyn and Thomas W. Richards. *Body Training Toward Self-Esteem and Employability of Adolescents.* Santa Monica, California: Kennedy Child Study Center (1339 Twentieth Street), n.d.

Two basic questions were considered in this study: 1) what is the actual effect of a special program designed to improve

physical competence of a youth upon his self-esteem concept? 2) What is the relationship of the adequacy of the self-concept upon one's employability? The following observations summarize findings: 1) valid and reliable methods for evaluating a course of specific therapy for physical improvement were available, 2) employability attributes judged on the basis of several factors, were estimated with confidence at the end of a 12 week period of scheduled therapeutic sessions in physical conditioning, 3) adolescent subjects responded to physical conditioning and showed improvement in physical control, appearance, and self-esteem, 4) improvement in physical appearance and competence and in self-esteem were correlated positvely with degree of participation, 5) positive ratings on personality characteristics such as dependability, self-care, and vocational goals were important in assessing self-concept and adjustment as well as employability attitudes and attributes.

243. LONGNECKER, Donald E. and Jean Ferson. "Discrimination Reversal Learning in Mongoloids." American Journal of Mental Deficiency 66: 93-99; 1961.

This study compared performances of mongoloid adults (N=8, males 4, females 4; CA 23 to 35; MA 4-? to 5-4) with those of a rat and fish in selected visual discrimination tasks. These subjects who had lived in a private residential school for ten to 15 years were given 20 daily trials for 32 consecutive days on a two-choice visual discrimination reversal problem to compare their learning processes with those found in a rat and fish under identical situations. During the first half of the study, within-day learning curves of all being studied were similar; between-day learning of mongoloid adults followed a pattern similar to that of the rat. During the second half of the study, a sharp decrease in errors for mongoloid subjects and a gradual decrease of errors of the rat were noted. This suggested that both were capable of one-trial learning, but mongoloid subjects reached higher levels of performance. No such learning was shown by the fish. The one mongoloid individual able to verbalize the solution to the problem was the only one capable of reaching perfect performance that required 24-hour retention; ability to concentrate on the task affected performance level.

244. LOOVIS, E. Michael. *Status of Physical Education for the Mentally Retarded in the State of Ohio.* Master's thesis. Columbus, Ohio: Ohio State University, 1971.

A survey of 42 city directors of physical education, to which 31 (73.8 percent) responded, showed that educable mentally re-

tarded students in public school systems of Ohio received the same amount of physical education as normal students. Additionally, a survey of the 88 county programs of mental retardation and ten ancillary institutions for retarded persons to which 65 (66.3 percent) responded, revealed that 80 percent of county programs and institutions offered physical or quasi-physical education classes for trainable mentally retarded students in their schools.

245. LOWE, Benjamin. *Effects of Physical Education on the Cognitive Functioning and Physical Development of Educationally Subnormal Boys.* Dissertation. Birmingham, England: University of Birmingham, October 3, 1966.

This study was designed to replicate Corder's study (see page) and to investigate effects of a varied physical education program on cognitive and physical development of educationally subnormal boys (N=24; CA 11-10 to 15-1). Subjects were divided into three groups of eight--experimental, officials, and control. The experimental group participated in 20 one-hour physical education lessons over a four week period; the officials group received special attention and performed such duties as keeping score, maintaining records, and counting for members of the experimental group. During physical education periods; the control group was only tested. Evaluative instruments included Goodenough Draw-A-Man, Raven's Colored Progressive Matricies, and Maxwell Shortened Version of Weschler Intelligence Scale for Children (IQ), and the Bookwalter Individual Fitness Test consisting of (pull-ups, push-ups, squat thrusts) and Sargent Jump (physical development). Only the experimental group made significant gains on Goodenough and Maxwell tests so it was concluded that the Hawthorne effect was not operative. Physical performance scores highly favored the experimental group. Results supported Oliver's findings (see page) and some of Corder's with respect to positive effects of active participation in intensive programs of physical education on cognitive function of educationally subnormal boys.

246. LOWRY, Calvin C. *Comparative Performance of Educable Mentally Retarded on the Kraus-Weber Test.* Master's thesis. Springfield: Missouri: Southwest Missouri State College, 1969.

The Kraus-Weber Test of Minimum Muscular Fitness was administered to educable mentally retarded elementary school boys and girls (N=50; Caucasian and Negroid; CA 7 to 12). On only one of the six test items--flexibility--was a significant difference between races found. When compared with other sutdents using the Kraus-Weber Test there seemed to be less difference in per-

formances between educable mentally retarded and trainable mentally retarded subjects than between educable mentally retarded and normal groups. The sex of subjects did not appear to be a factor in performance. Differences among educable mentally retarded boys and girls. On strength items, there tended to be a lower percentage of performance failures by older students. However, older subjects had an increasing number of failures on flexibility items.

247. MARTIN, Thomas J. and Helen K. Wilson. "Effects of Three Different Conditioning Programs on Mentally Retarded Children." *Abstract of Research Papers, 1970 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1970.

Ninety-three mentally retarded children of junior high school age (IQ 60 to 90) participated in a four-week program to evaluate effects of various types of conditioning programs as measured by the AAHPER Youth Fitness Test. All students took the fitness test and were then entered into a program of circuit training, volleyball, or quiet games; at the end of four weeks they were tested again. Comparisons of pre and post-conditioning tests for each of the seven test items for the three groups indicated that: 1) circuit training had a negative effect on the softball throw and standing broad jump, a positive effect on pull-ups, and although not significant, a positive influence on the shuttle run; 2) volleyball had a negative effect on the 600-yard walk-run and standing broad jump, and although not significant a possible negative erfect on the softball throw; and 3) quiet games had significant positive effects on pull-ups and negative on softball throw and standing broad jump. All three conditioning programs had a significant negative effect on the standing broad jump; circuit training and quiet games programs significantly decreased performance in the softball throw; the volleyball program also seemed to decrease performance in this event. Volleyball did not significantly increase arm strength as measured by pull-ups; pull-ups scores were significantly improved by quiet games and circuit training programs.

248. MASTERS, Tony. *An Investigation into the Significance of Recreation for the Educable Mentally Retarded.* Master's thesis. Laramie, Wyoming: University of Wyoming, August 1968.

This study was designed to: 1) review development of recreation programs for mentally retarded persons, 2) report current trends and status of these programs, 3) determine importance and values of recreation for educable mentally retarded partici-

pants, 4) identify types of recreation programs found in state institutions for EMR, and 5) determine how these programs could be developed further. Questionnaires were designed to obtain information about these specific aspects of recreation programs for EMR: 1) general information, 2) characteristics on institution and program, 3) specific activities, 4) recreational skills and results, and 5) specific opinions. Questionnaires were sent to 12 recognized leaders in the field (50 percent were returned) and to personnel from 132 state institutions with mentally retarded residents (65 percent were returned.

On the basis of data received, the following conclusions seemed justified: 1) recreation programs were felt essential in the treatment of educable mentally retarded persons, 2) state institutions provided daily recreation programs of varied activities for mentally retarded resisents although the majority of respondents felt that programs were not adequate, 3) a variety of physical facilities were provided for conducting these recreation programs, 4) the majority of these recreation programs were directed by professionally qualified leaders but these programs were not staffed with sufficient numbers of qualified personnel, 5) participation in recreation activities was felt to contribute to physical, social, emotional, and intellectual development of mentally retarded persons, 6) specific recreational skills were taught and used to help retarded individuals assume their places in society, 7) correlation was found among opinions of the jury about the composition of ideal recreation programs for educable mentally retarded persons and policies governing recreation programs in these state institutions, and 8) people must be made to realize that mentally retarded individuals are fellow human beings who can become assets to their families and communities rather than burdens and liabilities to society.

249. MAY, Joseph W. *An Experiment in Physical Education with Mentally Retarded Children."* Master's thesis. Los Angeles, California: University of Southern California, August 1959.

This study evaluated physical and social growth of mentally retarded youngsters who participated for one semester in an organized physical education program. Ten physical performance tests were administered to the children to evaluate their physical skills. Findings showed that all children in the group improved both physically and socially during the program; parents believed their children had improved.

250. MAYNARD, Marianne. *The Therapeutic Value of Teaching Art to the Mentally Handicapped Child.* Master's thesis. Detroit, Michigan: Wayne State University, 1955.

This study dealt with art education as a therapeutic measure to be used with mentally retarded children. Mental retardation is defined, causes of retardation are presented, and examples of how art education can contribute to growth and development of retarded children are discussed in the study.

251. McBride, Ruth, Jerome Kaplan, and Manford Hall. "Community Planning to Meet Some of the Social Needs of the Mentally Retarded Adult." American Journal of Mental Deficiency 58: 2: 331-336; October 1953.

This study describes functions of a fun club designed to provide opportunities for mildly mentally retarded adults to learn to get along with others in a group environment. It was felt that participation would 1) improve their adjustment to work, school, and other living situations, 2) provide a wholesome environment for activities rather than some considered questionable by guardians and or social workers, and 3) afford a few hours of needed relief for parents or those with whom these retarded adults resided.

A fun club (N=30; CA 18 to 40) was organized fo fulfill four functions: 1) teach recreational skills, 2) find others with whom individual club members had social and friendly relationships, 3) help individual members develop more satisfying and mature relationships, and 4) provide members with opportunities to learn about and participate in democratic group life. It was felt that a community plan could be developed, modified according to local situations, and adapted for mentally retarded persons of all age levels and with varying degrees of social competence.

252. McCall, Judith Dubonn. *The Effectiveness of Movement Education Through a Rhythmic Structured Program Offered to Trainable Mentally Retarded Children--A Case Study Approach.* Master's thesis. Greensboro, North Carolina: University of North Carolina Greensboro, 1970.

Children (N=12) enrolled in a special school for retarded children were rated on their ability to walk, hop, and jump. A special rating scale was designed to evaluate objectively performances of each subject on these basic movement patterns. Results of the mechanical analysis of the walk indicated that changes in performances did occur; no changes were noted in

jump or hop. Results suggested that a program of movement education through a rhythmically-structured approach could help trainable mentally retarded children understand more about their bodies and how they move; each subject was able to perform these basic movement patterns.

253. McCANTS, Robert George. *The Effects of a Selected Trampoline Program on the General Motor Performance of a Group of Mentally Retarded Children.* Master's thesis. College Park, Maryland: University of Maryland, 1962.

Effects of a selected trampoline program on a group of mentally retarded children (N=22; CA 7 to 12; IQ 40 to 60) were investigated. An experimental group participated twice per week for eight weeks in a selected trampoline program based on recommendations made by Getman. Pre and posttest levels of motor performance were evaluated by the Sargent Jump, balance on one foot for 30-seconds, tapping speed, and an agility run. The experimental group improved significantly on all four test items while the only significant change made by the control group was a regression in performance on the balance test item. It was concluded that 1) this trampoline program did favorably influence these motor variables and led to improvement in motor coordination, 2) modifications had to be made in presenting skills and activities to moderately mentally retarded students, 3) repitition was necessary and motivation important in sustaining their interests, 4) test items had to be selected in terms of each retarded youngster's ability to understand them and what was expected of him, and 5) youngsters in the experimental group according to reports from classroom teachers, showed improvement in academic work and social abilities.

254. McCARTHY, Elizabeth M. "Physical Education Stimulates Mental Activity." Training School Bulletin 42: 154-162; 1945.

This article describes many aspects of a physical education program conducted at a state training school for mentally retarded persons. Basic activities included in the program were marching, calisthenics, dancing, and games. Marching was included to develop better posture and coordination between mind and body. Calisthenics were divided into free hand and light apparatus work. Dancing activities were used to develop poise, coordination, grace, teamwork, and a sense of rhythm. Both active and quiet games were included in the program. The article also describes a typical day at the training school.

255. McCARTNEY, Louise Dowley, "A Program of Motor Therapy for Young Mentally Deficient Children of the Non-Familial Type." Training School Bulletin 53: 98-105; June 1956.

The purpose of this study was to determine educational experiences which were effective as part of a differential program for non-familial mentally deficient children (N=13; IQ 50 to 70; CA 6 to 10; MA 3-6 to 5-2) who possessed certain characteristics indictive of developmental needs in the motor area. At the beginning of this study five of the 13 could not jump on both feet or hop on one foot. At the end of five months of instruction, each of these five children could jump. All subjects demonstrated refinement in control and coordination of movements as shown by improvement in ability to trace, follow dot pictures, write numbers, print names, and copy simple words. All youngsters improved basal score on the Oseretsky Tests of Motor Development and showed an average increase of eight months on motor scores of the Primary Mental Ability Test. It was found that older children did not always show greatest growth for either test scores or in refinement of control and coordination of movements. It was felt that all of these various growths and improvements were due to directed teaching and not primarily to natural maturation.

256. McCRAW, Lynn and Guy Owen. "Motor Ability and Fitness of Institutionalized Mentally Retarded." *Abstract of Research Papers, 1968 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1968.

This study involved an examination of institutionalized mentally retarded individuals in terms of physical ability, body size, maturity, and levels of adaptive behavior. Subjects (N=1292, males 545, females 747; CA 6 to 51) were given a motor fitness test consisting of 25-yard dash, standing broad jump, and 300-yard run. Motor ability was assessed through administration of the Brace Motor Ability Test which was scored on a four point scale rather than the usual pass fail method. Body size was expressed in terms of height and weight; skinfold measurements of arms and shoulders were taken. Subjects were classified according to adaptive levels and age: I-profoundly retarded, II-severely retarded, and III-moderately retarded. Groups were set up in three-year spans from six to 20 and in five year spans from 21 to 50. Examination of data in terms of these classifications revealed: 1) an increase for both male and female subjects in height, weight, and skinfold measurements at all adaptive levels within each age group up to 26, 2) performances on the Brace Test and the three fitness items improved markedly for both sexes from adaptive level to

adaptive level with differences between levels I and II significiantly greater than those between levels II and III, and 3) performances on the Brace Test and the three fitness items increased with age until about age 20 from which point there was a gradual decrease.

257. McGINN, John, Kenneth Varshay, and Angelo A. Acoella. *Programs for the Mentally Retarded.* Albany, New York: New York State Recreation and Parks Society, April 1966.

Findings of a survey to determine number of recreation departments in New York State actively involved in programing for mentally retarded persons were presented. No attempt was made to assess quality or quantity of programs nor to ascertain degree of success or failure of these programs. Questionnaires were sent to 79 municipal or school recreation personnel throughout New York State. Of 61 replies (77.3 percent), four came from counties, ten from towns, 11 from school districts, 21 from villages, and 15 from cities. Fifteen departments were identified that at the time of the survey were conducting programs; 46 (58.2 percent) communities did not conduct such programs and 18 (22.8 percent) communities did not respond. Information about plans for initiating programs, age range of participants served through existing programs, degree of retardation of participants, when programs were offered, fees and charges for services, and available facilities was reported.

258. McLAUGHLIN, Ken. *To Determine the Effect of a Program of Progressive Physical Exercises on the Physical Fitness of Institutionalized Mentally Retarded Adult Males Suffering from Tuberculosis.* Graduate thesis. London, Ontario (Canada): University of Western Ontario, April 1968.

This study attempted to determine effects of a program of progressive physical exercise (RCAF 5BX program) on levels of physical fitness of institutionalized mentally retarded males (N=11; CA 26-9 to 46-5, $\bar{X}$ 37-7; IQ 39 to 81, $\bar{X}$ 54.8) who at one time or another had active tuberculosis. The control group was on the average older, less intelligent, and in worse physical condition than the experimental group. Measures of balance, agility, speed, strength, power, muscular endurance, coordination, and organic fitness were administered to both experimental and control groups at beginning and end of a special 11-week program. There was no significant change between pre and posttest scores in any measure for the control group. On the other hand the experimental group showed significant progress in all measures but organic fitness. A positive but low correlation (r=.30) and IQ

of the experimental group.

Conclusions drawn from the study included: 1) physical fitness of institutionalized mentally retarded adult males suffering from tuberculosis was improved significantly by participation in a planned and progressive program of physical exercise, 2) no definite relationship existed between IQ and physical performance in this study, and 3) patient reaction to the program was encouraging and the program seemed to be definitely worthwhile.

259. McMANIS, Donald. "Pursuit-Rotor Performance of Normal and Retarded Children in Four Verbal-Incentive Conditions." Child Development 36: 667-683; September 1965.

The study was designed to determine effects of praise, reproof, competition, and neutral social incentives on both accuracy and persistence of children's performance on a pursuit rotor-task. Children of both sexes (N=96; normal 48, retarded 48) were compared in terms of accuracy of performance and willingness to persist voluntarily at the task. It was generally concluded that normal subjects performed more accurately in all areas than retarded children. Some differencies in performances were found between boys and girls of both groups.

260. MEAD, Cyrus D. "Height and Weight of Children in Relation to General Intelligence." Pedagogical Seminary 21: 393-406; 1914.

Relationships of height and weight to general intelligence were investigated in this study; 288 boys and 143 girls a state residential school for feeble-minded youth were compared with those of 236 boys and 145 girls of normal intelligence attending public schools. Physical, mental, strength of grip, and dexterity tests were administered to all subjects. Results showed: 1) the more decided the mental deficit, the more restricted the height, 2) differences in weights of the two groups of boys, and 3) adolescent girls taller and heavier than adolescent boys in both groups.

261. MEEHAN, D. R. *A Comparison Study: Physical Education for Junior High Mentally Retarded Students.* Butler, Pennsylvania: The Author (306 Mellon Bank Building), n.d.

Performances of junior high educable mentally retarded boys participating in a daily one-hour physical education period (experimental group) were compared with a similar group of boys from a different section of the county who had two 60-minute physical education periods a week (control group). The

program of the experimental group consisted mainly of rope climbing, push-ups, pull-ups, tumbling, calisthenics, hopping, skipping, jumping rope, and walking rails and balance boards. The control group participated in a traditional Junior High School physical education program. At the end of the school year both groups were tested under the same conditions by the same examiners with a battery of 14 physical proficiency tests including two activities in which they had never participated.

Each youngster in both groups was rated on every activity according to a scale based on excellent, good, fair, poor, and unsatisfactory classifications. The experimental group out performed the control group in every activity including the two new tasks. In individual scoring, the two best students in the control group could only perform better than the two porrest students in the experimental group.

262. MOENCH, Mildred Harrod. "The Relation of Intelligence to Underweight." Teacher's College Journal 21: 23-26 and 30-31; November 1949.

Relationships between intelligence and weight of children were investigated. Subjects (N=458, girls 237, boys 221; CA 6 to 16) were students in grades one through eight in a public elementary school. It was found that the highest percentage of underweight children was in the lowest intelligence group with IQs below 70; none of the children with IQs of 121 and over was underweight. Continued malnutrition was felt to be a possible cause of permanent decrease in mental ability and to interfere with everyday success of the children. Teachers should be aware of the damages of malnutrition and of children being substantially underweight.

263. MOFFETT Harry and Linda Odum Moffett. *The Effect of a Diagnostically Designed Program on the Recreative Functioning Level of the Trainable Mentally Retarded Child.* Master's thesis. Tallahassee, Florida: Florida State University, 1969. See article "Diagnostically Designed Recreation Program for Trainable Mentally Retarded Children." Journal of Leisure Research 2:2: 93-103; 1970.

This study was designed to determine effects of a diagnostically designed recreation program on recreative functioning of institutionalized trainable mentally retarded children (N= 53; CA 8 to 15; IQ 30 to 55). Subjects had no previous contact with the Florida State University Diagnostic Battery of Recreative Functioning of the Trainable Mentally Retarded, the instrument used in this study; they were observed and rated by a panel of three judges while

performing selected activities. The investigators administered the test battery as a pretest to each subject; sixteen students were then designated as a test-retest group and retested. The remaining 37 subjects were ranked and homogeneous groups established: 1) experimental meeting twice a week, 2) experimental meeting four times a week, 3) control meeting twice a week, and, 4) control meeting four times a week; all group meetings were for one hour. Pretest results were used to design a diagnostically based recreation program that was conducted for five consecutive weeks for experimental groups; control groups participated in the regular recreation program conducted by the investigators.

Subjects were postjudged and posttested as in prejudging and pretesting. Conclusions were that 1) the test-retest group showed the battery to be reliable, 2) the diagnostically designed recreation program was effective in raising recreative functioning level of these trainable retarded subjects, and 3) the battery did test recreative functioning level.

264. MONKHOUSE, Ruth Tompkins. *Proposed Physical Education Program for Educable Mentally Retarded Children.* Master's thesis. Austin, Texas: University of Texas, 1963.

This study provides a suggested physical education program for primary grade educable mentally retarded children (CA 7 to 10) based on the premise 1) that mentally retarded children were retarded in motor development as well as in intellectual development, and 2) that mentally retarded children could profit from a physical education program designed to improve motor coordination and general physical ability. The program consisted of sequential games, rhythms, stunts, and creative activities. Although the program was used for two years in a public school, no experimental testing was included to support or validate the program. Results of observations indicated positive effects and growth in strength, endurance, and flexibility of children who participated in the program.

265. MORAN, Joan May. *The Effects of the Front Crawl Swimming Stroke on Trainable Mentally Retarded Children.* Doctoral dissertation. Salt Lake City, Utah: University of Utah, August 1971.

This study was designed to determine 1) effects of teaching the front crawl swimming stroke on development of IQ (Peabody Picture Vocabulary) and social competence (Vineland Social Maturity Scale) of trainable mentally retarded children (N=20; CA 5-4 to 7-1; IQ 25 to 55), and 2) if participating in this

activity was more effective than performing conventional developmental tasks (e.g., puzzles, color and shape recognition, lacing shoes, building blocks, kitty in kegs, stack color and size sets). Subjects were divided into two matched groups according to CA, pretest MA, pretest social age, and sex; each group participated in its respective activities in two 30-minute sessions per week for ten weeks. Hawthorne effects were controlled by having the same time allotments and schedule for each group, all instruction on a one-to-one basis,and the same teacher and aides working with both groups. Data indicated that 1) youngsters who learned the front crawl stroke showed significant improvement in both IQ and social competence scores, and 2) subjects who performed developmental tasks improved significantly only in social competence scores. Conclusions were that TMR children could improve in social competence when given individual attention, and swimming the front crawl had potential for bringing about significant increases in IQ scores.

266. MORENO, Nedia Dora. *A Study of Static and Dynamic Balance of One Hundred Educable Mentally Retarded Children in Laredo, Texas.* Master's thesis. Denton, Texas: Texas Woman's University, August 1968.

This study was designed to correlate performances of 100 educable mentally retarded children (N=57 boys, CA $\bar{X}$ 12.8; 43 girls, CA $\bar{X}$ 12.3; CA 8 to 15, $\bar{X}$ 12.6; IQ 47 to 77, $\bar{X}$ 63.8) in elementary junior high, and senior high schools on tests of static (Bass Balance Stick Test) and dynamic (Springfield Beam Walking Test) balance with IQ and chronological age. Results showed 1) low positive and significant relationships between static balances and IQ and CA, 2) low positive relationships between dynamic balance and IQ and CA, 3) low positive relationships between static and dynamic balance and 4) higher an IQ, the higher dynamic balance scores.

267. MOSIER, H. D. Jr., H. J. Grossman, and H. F. Dingman. "Physical Growth in Mental Defectives." Pediatrics 36: 3: 465-519; September 1965.

A survey of physical measures was made on 2,472 institutionalized mentally defective patients; this report provides results for 2,027 Caucasian subjects. Means and standard deviations for each measure are reported by sex, age, IQ, and diagnostic category. Body weight, crown-heel height, symphsis-heel height, hiacromial diameter, and hicristal diameter were all smaller than in normal persons for both sexes. Degree of impairment was directly related to degree of IQ deficit, no differences among diagnostic categories in degrees of stunting of growth were noted other than for mongoloid subjects for whom stunting

was greater than in the other categories; shortness of lower extremities accounted for this difference. In contrast, measurements of widths of shoulders and pelvic girdles and length of spine among mongoloid subjects were no different than for other diagnostic categories. On the basis of experiments with brain lesions and observations of human subjects, ways in which brain injury produced stunded growth in humans were unclear.

268. MUSGROVE, Dolores Maria. *A Factor Analytic Study of Perceptual Motor Attributes as Measured by Selected Test Batteries.* Doctoral dissertation. Greeley, Colorado: University of Northern Colorado, 1970. Article "A Factor Analytic Study of Perceptual-Motor Attributes as Measured by Two Batteries" Perceptual and Motor Skills 34: 227-230; February 1972.

Scores of 80 first and second grade public school children (CA 5-11 to 7-6) were factor analyzed on the 28 test items of The Perceptual-Motor Attributes of Mentally Retarded Children and Youth battery (Cratty) and The Purdue Perceptual-Motor Survey (Roach and Kephart). Factors were extracted and nine of them named: 1) visual tracking; 2) visual discrimination and copying of forms; 3) visual discrimination and copying of rhythmic patterns; 4) verbal body image; 5) dynamic balance; 6) spatial body perception; 7) postural maintenance; 8) visual discrimination and copying of motor patterns, and 9) gross ability. The study indicated that individual test items were very specific in nature and measured very specific perceptual motor acts since items purported to measure the same general skill loaded on different factors.

269. NEAL, Larry L. *An Investigation of Attitudes Toward and Participation of Special Education Teenagers and Their Nonretarded Peers in Oregon's State Parks.* Doctoral dissertation. Eugene, Oregon: University of Oregon, 1969.

This study was designed to compare attitudes of educable mentally retarded teenagers with attitudes of nonretarded teenagers toward state park services and use of Oregon State Parks. Fifteen randomly selected EMR youth from special education classes and 15 matched nonretarded junior and senior high school youths drawn from four different communities constituted the 120 subjects. An interview-questionnaire was used to collect data concerning number of different parks visited, total number of visits, individuals with whom youth visited, types and numbers of major activities engaged in, number of over-night stays, length of family vacations, and attitudes toward state park serv-

ices. Statistical analyses for each of the variables included measures of central tendency, frequency distributions or percentages, and application of a chi-square test. Educational capacity--retarded as compared to nonretarded--had a definite influence upon participation in Oregon State Parks; the majority of EMR youth participated less than their nonretarded peers. Attitudes of both groups toward state park services were generally favorable and recommendations for improvements were listed.

270. NELSON, Joan and Gail A. Harris. *Current Practices in Teaching Physical Education to Educable Mentally Handicapped Pupils.* Big Rapids, Michigan: Ferris State College, n.d.

These researchers obtained answers to questions concerning physical education opportunities available to educable mentally retarded children in Michigan. A questionnaire was sent at random to 548 teachers of educable mentally retarded children to determine: 1) if educable mentally retarded children had opportunities to participate in physical education programs, 2) kinds of programs offered, and 3) whether trained personnel were in charge of the programs. Responses from 389 teachers (71 percent) indicated: 1) amount of physical education offered retarded children was about the same as for normal youngsters, 2) amount of physical education increased as students moved up through the grades, 3) most physical education teachers had no training or experience in working with mentally retarded children, 4) a large number of special education teachers were teaching physical education to their own classes, 5) as grade level increased, integration of normal and mentally retarded children increased, and 6) mentally retarded and normal children participated in similar activities.

271. NEMAN, Ronald (project director). *Sensori-Motor Training Project.* Arlington, Texas: National Association for Retarded Children, (2709 Avenue "E" East), June 1973.

The Sensori-Motor Training Project was established under the auspices of the National Association for Retarded Children to investigate the efficacy of methods based on those utilized and taught at the Institutes for the Achievement of Human Potential (IAHP) and sometimes popularly referred to as Doman-Delacato methods of treatment. However, the research project focused on programs' conducted at the Dallas (Texas) Academy and at the New York Institute for Child Development rather than those operated at the IAHP in Philadelphia. Two research projects were initiated: 1) an experimental study of the neurological organization program as implemented by members

of the Dallas Academy staff with residents of Denton (Texas) State School, and 2) a survey of parents who had utilized the methods with their own children at home. These programs were supervised by the New York Institute for Child Development, the Dallas Academy, and three other unit members of the American Academy for Human Development (AAHD) located in Chicago, Omaha, and Atlanta.

In the Denton State School study, three groups of mildly and moderately retarded residents were used to assess neurological training procedures administered during a seven-month period. Prior to group assignments, subjects were individually matched by age and sex; matched triplet members were than randomly assigned among three study groups. During the first part of the study, subjects in the Experimental 1 (E1) group were exposed only to the motor and visual-motor components of the programs; during the second part of the study sensory stimulation components were added to the E1 program. Subjects in the Experimental 2 (E2) Group were given a program of unstructured physical activity and recreation and personalized attention during the first part of the study; this program was augmented during the second part with the same sensory stimulation program given to E1. The third group, Passive Control (PC), provided baseline control data; it's members were tested whenever other subjects were tested but they did not participate in a special program. All subjects prior to inclusion in the study were examined by evaluators trained at the IAHP, Philadelphia, and were certified as suitable participation for the experimental regimen. All subjects (23 in each group) were evaluated on a variety of test instruments during four testing sessions: 1) prior to the beginning of the study, 2) three months after the program had been initiated, 3) at the conclusion of the study, and, 4) after a three month no program period. Dependent variables included scores from the following tests: Stanford-Binet; Peabody Picture Vocabulary Test; two verbal and two performance subscales from the Wechsler Intelligence Scales for Children; Frostig Developmental Test of Visual Perception; Illinois Test of Psycholinguistic Ability; Lincoln-Oseretsky Motor Development Scale; and the Profile of Development, an instrument used by the Dallas Academy which was very similar to the Profile used by the IAHP.

Specific changes were observed favoring Group E1 on tests of visual perception and motor performance. Both experimental groups showed greater gains in language development than did the control group. Intellectual functioning appeared to be enhanced only slightly as a result of experimental procedures. Researchers concluded that portions of the AAHD methods evalu-

ated at Denton should be recognized as one legitimate appraoch in the remediation of certain handicapping conditions.

Copies of a survey form aimed at evaluating attitudes toward and experiences with home therapy programs were mailed to 778 families whose names and addresses were provided by the five previously mentioned AAHD facilities. Responses which were sufficiently complete for inclusion in data analyses were obtained from 282 (36.1 percent) of the families. Programs were evaluated as being of much positive benefit in a significant majority of the cases. Ninety percent of respondents attributed some positive change to the program and a significant majority (59.9 percent) said they did not think improvements would have happened without the program. When asked if they would repeat their experience with home programs, 82.5 percent said yes. Furthermore, 85.8 percent of the families said they would recommend the program to other families. More than half the respondentsindicated positive improvements in: 1) learning ability, 61.7 percent, 2) concentration and attention span, 56.3 percent, 3) visual performance, 57.0 percent, 4) mobility, 51.0 percent, and, 5) reduction in hyperactivity, 54.9 percent.

A few families said the facilities in question made specific promises as to treatment outcomes such as learning to read (11.7 percent), improvement in IQ (3.5 percent), or getting well (3.9 percent). Some parents (9.5 percent) indicated that detrimental effects occurred in terms of family interpersonal relationships. Anecdotal material showed realistic appraisals and awareness of difficulties in administering training programs within the home even when outcomes were regarded as highly favorable.

272. NORDGREN, Bengt. "Physical Capabilities in a Group of Mentally Retarded Adults." Scandinavian Journal of Rehabilitation Medicine 2: 125-132; 1970. "Physical Capacity and Training in a Group of Young Adult Mentally Retarded Persons." Acta Paediatrica Scandinavia Supplement 217: 119-121, 1971. With Lars Backstrom. "Correlations Between Muscular Strength and Industrial Work Performance in Mentally Retarded Persons." Acta Padiatrica Scandinavia Supplement 217, 1971

A group of young mentally retarded persons (N=63, men 39, women 24; CA 19 to 39; IQ 30 to 70) undergoing habilitation industrial training in Sweden were studied with bicycle ergometry (including heart rate, electrocardiogram, blood pressure, respiratory frequency at rest and after action), maximal isometric muscular strength evaluation, and anthropometric measurements, and were compared with a normal population. Subjects were also divided into educable and noneducable groups

for comparisons. Study of mean physical capabilities showed: 1) skeletal development of trainees provided no constitutional barrier to training of muscle strength since no significant differences in body build existed between this group and the normal population; no significant differences were found in anthropometric data between educable and noneducable trainees; 2) lower muscular strength of trainees than in normal persons; this was more pronounced in noneducable subjects; 3) considerable variation in trainees' circulatory functional capacities although mean physical work capacity values did not deviate essentially from those of the normal population; this was noted especially in the male group in which all trainees did not complete the bicycle ergometer task. A program of gymnastic training--one hour twice a week for two months--was carried out with some subjects. Physical work capacity was about 30 percent higher in the men after training; in the female group, no appreciable differences were found. The industrial work of trainees at no stage demanded great physical effort so physical work capacity was not expected to be a determining factor for industrial work achievement. This finding was consistent with the finding of no correlation between assessments of industrial work and results of bicycle ergometer tests. However, a distinct correlation was found in the men--but not women--between muscle strength, especially in upper extremities, and industrial work.

NOTE: For additional information about this study and reprints contact Bengt Nordgren, M.D., Department of Clinical Physiology, University Hospital, S-750 14, Uppsala, Sweden.

273. NUNLEY, Rachel L. "A Physical Fitness Program for the Mentally Retarded in the Public Schools." Journal of the American Physical Therapy Association 45: 10: 946-954, 1965.

This study was designed to obtain information about motor abilities, strength, endurance, and coordination of a group of trainable mentally retarded children (N=11; CA 9 to 14, $\bar{X}$ 12-6; MA 4 to 6, $\bar{X}$ 4-8; IQ 36 to 55, $\bar{X}$ 46). Subjects were evaluated with the Stanford-Binet Intelligence Test and a motor ability test consisting of 13 items (rolling, prone extension, crawling, hop, skip, reciprocal arm swing, standing broad jump, stair climbing, tie shoe laces, vertical jump, squat-thrust, three forward rolls). On a posttest given 15 months after participation in a daily program for 30 to 45 minutes per day, subjects showed gains in strength, endurance, adjustment and socialization. The majority of the subjects showed improvement in their scores by at least one grade.

274. OAKS, Merrill Mathew. *An Evaluation of the Effectiveness of a Developmental Sequence for Teaching an Industrial Education Psychomotor Task to Severely Mentally Retarded Students.* Doctoral dissertation. College Park, Maryland: University of Maryland, 1970.

The objective of this study was to develop, implement, and evaluate a method for teaching industrial education motor skills to severely mentally retarded boys (CA 8 to 15). Effectiveness of the method was evaluated by comparing prior knowledge, inital learning, and retention as measured by performance ratings of scribing, sawing time, and safety practices administred prior to, immediately following, and 10 days after the instructional period. The instructional program was conducted for five days; no instruction took place during the 10 day period after the posttest. Results revealed that the sequential method utilized was effective for teaching a scribing-sawing psychomotor task to severely retarded boys; the method was also responsible for significant retention of learning. It was felt that a similar sequential technique could be applied to teaching other industrial education activities and academic subjects and for teaching children of higher ability levels. It could also be used by regular classroom teachers who instruct in specialized subjects.

275. O'CONNOR, N., S. Gordon and J. Tizard. "Some Effects of Incentives on the Performance of Imbeciles." British Journal of Psychology 45: 277-287; 1954-1955.

Responses of 27 low grade mentally defective males (imbecile level) to different incentives and behavior modification techniques were investigated. Subjects were randomly divided and participated in three experiments of a single trial each on a leg persistence test. First and second experiments consisted of 10 meetings each while the third was a single session. Findings suggested that low-grade mentally defective males were capable of responding and did so differently to varied incentives; significant factors in improvement depended on kind and sequence of incentive.

276. OLIVER, James N. "The Effect of Physical Conditioning Exercises and Activities on the Mental Characteristics of Educationally Subnormal Boys." British Journal of Educational Psychology 28: 155-165; June 1958.

This study investigated effects participating for 10 weeks in systematic physical conditioning exercises and activities had on the mental characteristics of educationally subnormal

boys. Subjects were placed in experimental (N=20; CA 13 to 15; IQ 57 to 86, $\bar{X}$ 70.1) and control (N=20; CA 13 to 15; IQ 54 to 81, $\bar{X}$ 65.7) groups. All subjects were given the following intelligence tests. Terman Merrill, Goodenough Draw-A-Man, Raven's Matrices, Porteus Maze, and Goddard's Form Board; motor educability, athletic achievement, and physical fitness tests were also given. All academic subjects except numbers and English were replaced in the experimental group by activities of a physical nature--daily periods of physical education, individual remedial exercises, strengthening activities, and recreational games of a team nature. During this same period the control group followed its normal schedule including only two periods of physical education per week and daily organized games after school. Not only did the experimental group improve significantly in all measures of athletic achievement, physical fitness, and strength, but there were significant increases in the IQ's of 25 percent of the group--no significant improvements in IQ were reported among the controls.

277. OLIVER, James N. "The Effect of Physical Conditioning on the Sociometric Status of Educationally Sub-Normal Boys." Physical Education 52: 156: 38-46; 1960.

Sociometric tests requiring one of three positive or three negative choices were given to two groups of educationally subnormal boys to determine their decisions for 1) teammate, 2) friend to walk with, and 3) workmate. This information was used in organizing and reorganizing an experimental group to participate in a physical conditioning program so that 1) group tensions were reduced to a minimum, and 2) boys not mutually acceptable to each other were paired together in an attempt to foster mutual respect and adjustment. These boys were taking part in a much larger investigation into effects of physical conditioning exercises and activities on mental, physical, emotional, and social characteristics of ESN boys. The experimental group (N=20; CA 13 to 15; IQ 57 to 86) was drawn from the top class of a small residential school and the control group from another small residential facility matched as far as possible with the experimental group for age, intelligence, and physique. Sociometric tests results were most helpful when used in conjunction with other data such as height and physical ability. Results indicated: 1) mental ability was of little importance in acceptance or rejection of others on any of indicated criteria, 2) boys were chosen for physical prowess but not rejected because they lacked it--they were rejected more because of lack of acceptable personality traits, 3) effects of physical conditioning appeared to have little influence on sociometric decisions and were most

evident in choices of teammates, and 4) working together strengthened views the boys had about each other. The fact that these effects were slight was surprising and did not confirm subjective observations of staff and the researchers.

278. OLIVER, James N. "The Effect of Systematic Physical Conditioning on the Growth of Educationally Sub-Normal Boys." Medical Officer 19-22; 1957.

Effects of an intensive course of physical conditioning for three hours a day, five days a week for 10 weeks on a group of educable retarded adolescent boys (N=20; CA 13 to 15; IQ 57 to 86) were studied. The program included strengthening work, remedial exercises, and recreational activities. Results indicated that these boys showed: 1) marked improvement in nutritional status, 2) considerable reduction in orthopedic defects as psychological droopy posture disappeared completely while foot defects were the most difficult to treat, and 3) quality of growth, as indicated by progress on a Wetzel Grid, not only improved throughout the conditioning period but continued for some time after conditioning was over.

279. OLIVER, James N. "Pilot Investigation into the Effects of Circuit Training on Educationally Subnormal Boys." Research in Physical Education 11-19; October 1966.

Purposes of this study were to determine 1) whether circuit training could be used successfully with educationally subnormal boys when more attention was paid to organization and supervision, and 2) general effects of circuit training on these boys. Twelve boys from the top class (CA 14-7 to 16-0; IQ 56 to 82) in a residential school for educationally subnormal children were selected to participate in this study. Eight activities of a strengthening nature were selected to form a circuit. At the beginning of the investigation each boy was given a record card and the idea of circuit training explained. Activities were described and demonstrated, and when it was clear each boy knew what was expected of him, he was tested individually to obtain a maximum performance for each skill. The circuit was continued daily for seven days, after which the boys were retested for maximum performance again. This new score was entered on the record card, a new target was worked out and entered, and training continued for another 10 days when a final test for maximum performance was given.

Results showed: 1) 87.5 percent of the boys made improvements of from two to 2,900 percent over the range of activities; this wide variation in improvement was to be expected

since it was much more difficult to show improvement in some activities than in others; and 2) throughout the experimental period increased enthusiasm of the boys was noticable as they seemed to find this strenuous activity challenging and enjoyable, especially when they were able to record progress in their performance they talked about this improvement, discussed it with the teacher and others in the group.

280. OLIVER, James N. "The Relationship Between the Physical Characteristics and the Social and Emotional Characteristics of Educationally Sub-Normal Boys." Wing 2: 5-14; June 1964.

This study investigated relationships between physical characteristics and social and emotional characteristics of educationally subnormal boys (N=105; CA 12 to 16). Physical ability and physical achievement scores, height, weight, and emotional and social assessments were obtained for these boys who attended special schools. Finding showed: 1) substantial positive correlations between motor variables and emotional and social characteristics with highest relationships between social development and physical abilities, 2) emotional tensions were aroused and learning reduced when complex and difficult skills were presented, and 3) negligible correlation between size and emotional and social characteristics as size appeared to be no criterion of leadership among these boys.

281. PARDON, Charles D. *A Study of the Effects of A Perceptual Motor Activities Program on Dynamic Balance of Educable Mentally Retarded.* Master's thesis. Springfield, Missouri: Southwest Missouri State College, 1969.

This study was designed to measure effects of perceptual-motor activities on dynamic balance as measured by the Purdue Perceptual-Motor Survey. Educable mentally retarded boys and girls (N=120), chosen from three levels of special education classes at three different elementary schools, were placed in observation, control, and experimental groups at each school. Only experimental groups at each school showed significant improvement.

282. PARKER, James W. "Tactual-Kinesthetic Perception as a Technique for Diagnosing Brain Damage." Journal of Consulting Psychology 18: 6: 415-420; December, 1954

Uses of tactual-kinesthetic perception as a technique for diagnosing brain damage were studied in this investigation. Information was obtained for two groups of adult males: 1)

experimental (N=30 brain-damaged patients; CA $\bar{X}$ 25; MA $\bar{X}$ 14-1), and 2) control (N=30 hospitalized patients with no evidence of neurological involvement; CA $\bar{X}$ 23; MA $\bar{X}$ 15-2).

Following administration of the Bender-Gestalt test, and after examination of each individual for stereognostic ability, subjects were given tactual-kinesthetic tasks. These tasks were significantly better for brain-injured than non-injured patients than the Bender Gestalt test. No marked relationships were noted between tactual-kinesthetic task performances and location or extent of brain lesions.

283. PARKER, Richard Clyde. *The Effectiveness of Recreation with Severely and Profoundly Mentally Retarded Patients.* Master's thesis. Chapel Hill, North Carolina: University of North Carolina, 1965.

This study explored effectiveness of recreation activities for severely and profoundly mentally retarded patients in a residential facility. Specific attention focused on effects of participating in recreation activities in reducing behavior and management problems and in improving physical condition of patients. Four areas received major attention: 1) physical fitness as measured by an adaptation of the step test, 2) illness as determined by amount of time patients were sick, 3) ease of managing patients as determined by questionnaires completed by cottage parents, nurses, and recreation personnel, and 4) weight changes. A stimulus group (N=18; CA $\bar{X}$ 12.5; years institutionalized $\bar{X}$ 2.9) participated in routine recreational activities plus an additional ten hours of supervised recreation each week for four months. A control group (N=18; CA $\bar{X}$ 13.6; years institutionalized $\bar{X}$ 3.3) participated only in the regular recreation program of 15-hours of planned activity each week. It was found that: 1) both groups improved although the stimulus group improved more than the control group in all areas, 2) participation in activities led to improvement in physical fitness, 3) extra activity and attention resulted in less illness which in turn reduced necessary treatment and confinement to bed, 4) play in small groups increased awareness of others and of the individual himself, 5) less agressive behavior occurred, 6) opportunities to play with toys along with instruction in their proper use resulted in subjects making better use of free time, amusing themselves, more independently, being less withdrawn, and behaving better, 7) appetites improved, 8) sleeping habits were improved in that subjects went to sleep sooner and slept more soundly, 9) awareness of the environment beyond the cottage increased, 10) cooperation improved, 11) lost cause attitudes

of personnel was reduced, and 12) subjects benefitted physically and socially, as a result of involvement in recreation and play activities.

284. PASCAL, Gerald R. "The Effect of a Disturbing Noise on the Reaction Time of Mental Defectives." American Journal of Mental Deficiency 57: 7: 691-699; April 1953.

Study was made of the effects of a loud noise reaction time of 22 mentally defective subjects who had been trained on a simple reaction time tasks until plateaus in performance were reached. Reaction times of these subjects were then measured when a loud and disturbing noise was introduced with a ready signal. The overall first effect of the noise was pronounced increase in reaction time; this increase was found to be significantly related to both mental and chronological ages. A rough estimate of each subjects ability to adapt to a new situation was found to be related to effects of the noise on reaction time. A curve of adaptation showed an initial great reaction to noise, followed by a stage of adaptation. Some subjects simply failed to adapt to the noise while performances of others were completely disrupted.

285. PASCAL, Gerald R., L. M. Stolurow, R. N. Zabarenko, and C.S. Chambers. "The Delayed Reaction in Mental Defectives." American Journal of Mental Deficiency 56: 1: 152-160; July 1951.

A delayed reaction problem involving five choices to find a reward with different time intervals after placing the reward was given to 27 mentally defective males (CA 5-11 to 32; MA 2-1 to 7-1). Delay intervals ranged from two seconds to 14 days with a criterion of three successive correct responses. Significant relationships were found between maximum delay interval and mental age, IQ, and performance mental age; no relationship was found between maximum delay interval and chronological age. Number of trials on the delayed reaction problem was not a factor determining maximum delay so that no practice effect was indicated for this population. Estimates of immediate memory and verbal ability were not found to be significantly related to maximum delay interval. No relationships were found between the three-fold medical classification of these mentally defective subjects and maximum delay.

286. PERTEJO, Sensena J. "The Oseretsky Test for the Evaluation of Motor Function." Psychology Abstracts 26: 6283; 1952.

In this investigation the Oseretsky test of motor function which attempts to measure innate motor capacities was studied.

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Motor quotients, computed on the basis of motor age/chronological age relationships, yielded more substantial differences from normal for abnormal individuals than would be expected from results of the Terman-Merrill test. Mongoloid children were severely retarded in motor function, simple oligophrenics less so, and children with behavior problems even less. Tests of motor development were recommended for wider use in diagnosing conditions and in the training of retarded persons.

287. PETERS, Martha L. "Music Sensitivity--A Comparison of Mongoloid and Normal Children." Journal of Leisure Research 1:4: 289-295; 1969.

In this study no evidence was presented to indicate that mentally retarded (mongoloid) children had: 1) heightened music sensitivity, 2) a good sense of rhythm, or 3) aptitude for mimicry. These findings were in opposition to some statements and generalizations found in the professional literature.

288. PETERSON, LeRoy and Lloyd L. Smith. "The Post-School Adjustment of Educable Mentally Retarded Adults with that of Adults of Normal Intelligence." Exceptional Children 26: 8: 404-408; April 1960.

This study investigated postschool adjustment of a group of educable mentally retarded adults and compared it with adults of normal intelligence who had been judged to be of low economic status at the time they attended secondary school. There were 15 females and 30 males in each group; chronological age range of each group was 21-1 to 31-2; mean IQ for the EMR group was 65 and 103 for the normal group. Areas investigated and compared included education, work, home, family, social traits, and civic characteristics; much of this information was attained from a 117 item questionnaire. This investigation brought to light some deficiencies of mentally retarded subjects as citizens when compared to adults who were of normal intelligence when they attended school. Results also indicated that well-planned educational program at the senior high school level were needed to complete training and preparation of mentally retarded pupils so they could be productive and active members of the community.

289. PHARNES, Sandra J. *The Relationship Between Whole Body Movement and the Retarded Child's Ability to Learn Selected Geometric Forms.* Master's thesis. Greensboro, North Carolina: University of North Carolina at Greensboro, 1968.

Relationships whole body movements and ability of trainable mentally retarded children to learn selected geometrical

forms were investigated. Subjects (N=17) were divided into a control group which remained in the classroom and received no training or practice in whole body movements, and an experimental group which performed whole body movements around a circle, square, and triangle. All children were given pre, second, and posttests consisting of five items: put a formboard together, trace, copy, draw, and walk a circle, square, and triangle. Tests one, two, three, and five were rated subjectively by the researcher. Five raters, using a special scale, evaluated test four. It appeared that large motor movements performed around the circle, square, and triangle may have aided children in the experimental group learn to trace, copy, draw, and walk these figures faster than subjects in the control group.

290. PHILLIPS, Jacqueline. *A Study of Fourteen Blind Mentally Retarded Students in an Experimental Program of Physical Education Activities.* Master's thesis. Denton, Texas: Texas Woman's University, August 1966.

This investigation involved developing, presenting, and evaluating an experimental program of physical education activities for 14 blind mentally retarded children (CA 8 to 18) enrolled in the academic program of a state school. To help each subject master selected basic movements in physical education and to participate with some degree of success on playground apparatus, the investigator worked individually with each student for a minimum of 30 sessions. Each student's responses to original instructional techniques were recorded in diary form and included in comprehensive case studies which also presented the social history, psychological status, developmental programs, leisure time interests, and previous physical education experience of each subject. On the basis of the findings, the investigator made recommendations for planning and conducting physical education activities for blind retarded children and drew conclusions about the effectiveness of selected original techniques. She concluded that educable mentally retarded blind children could profit from group as well as individual physical education instruction and that trainable mentally retarded blind children could profit from individual instruction.

291. POWERS, Joseph Theodore. *Motor Learning and Performance of Mentally Deficient Males in Relation to Etiology and Intelligence.* Doctoral dissertation. Austin, Texas: University of Texas, May 1954.

The purpose of this study was to explore the status of physical performance of mentally deficient males (N=106;

IQ 20 to 70; CA 14-8 to 36-4) with respect to effects of etiology and intelligence on motor performance and learning. Evaluation instruments included: Brace Scale of Motor Ability (balance and agility items), Athletic Index (50-yard dash, standing broad jump, softball throw), Rogers' Short Strength Index (grip, pull-ups, push-ups, weight, height), Motor Learning Index (basketball free throw, tennis ball bounce, softball throw for accuracy, jump-and-reach, Burpee). Six group comparisons were made: 1) all morons vs all imbeciles, 2) endogenous morons vs endogenous imbeciles, 3) exogenous morons vs exogneous imbeciles, 4) all endogenous vs all exogenous, 5) endogenous morons vs exogenous morons, and 6) endogenous imbeciles vs exogenous imbeciles. General findings about subjects included: 1) morons attained a significantly higher physical performance level and showed a higher degree of ability to learn gross bodily motor skills than imbeciles, 2) intelligence, as measured by IQ and mental age, seemed to have some positive effect on physical performances of mentally deficient males, 3) factors which tended to produce physical differences between intelligence groups appeared to have less influence on endogenous groups than on exogenous groups, 4) etiology, as indicated by the endogenous/exogenous classification, seemed to have no significant effects on physical performances of mentally deficient males, 5) mental age appeared to have more relationship to the athletic index than to either measure of motor learning, 6) substantial relationship between total learning scores and physical performance measures appeared to be due in part to effects of mental age, 7) high relationship was found between performances on the Brace Test and athletic index scores, 8) balance had less relationship to other measures of physical performance than to agility, 9) little relationship was noted between measured intelligence and speed, 10) mental age was more closely related to athletic ability than to motor learning, 11) etiology had almost no relationship to initial scores or to raw score gains, 12) mental ages seemed to have more relationship to initial scores than to gains, and 13) poor performances of subjects with very low IQ's may have been related to fewer opportunities to participate in play and physical activities during the developmental years because of the effects of low intelligence.

292. PROJECT on Recreation and Fitness for the Mentally Retarded. *Rules Affecting the Eligibility of the Mentally Retarded for Interscholastic Athletics: A Survey of State High School Athletic Association.* ED 083 209. Washington, D.C.: American Association for Health, Physical Education, and Recreation, n.d.

This survey was designed to obtain information concerning procedures and practices used to determine whether or not

mentally retarded students were eligible to participate in interscholastic athletics. Personal letters and one page questionnaires were sent to the executive secretary or chairman of the high school athletic or activity association in the 50 states and the District of Columbia. Specific questions focused on 1) criteria to determine eligibility of mentally retarded students, 2) any limitations placed on their participation, 3) rationale and reasons why they were denied opportunities to participate, 4) plans being formulated to change rules to grant their eligibility, and 5) any differences in rules for mentally retarded students enrolled in special classes in regular schools and for those enrolled in special schools. Returns were received from 50 of the 51 (98 percent) state high school athletic associations. Analyses of answers showed that procedures fell into three categories: 1) eligible in 22 (44 percent) of the states, 2) eligible on the basis of a broad interpretation of the by-laws in 10 (20 percent) of the states, and 3) not eligible in 17 (34 percent) of the states. The report included a detailed discussion of each of the categories, reasons and rationale presented by respondents, and contains recommendations for change and action according to categories.

293. PRUESS, Larry A. *The Status of Physical Education Programs for Mentally Handicapped Children in the State of Wisconsin.* Master's research project. Boulder, Colorado: University of Colorado, 1972.

Through this survey the status of physical education programs for mentally handicapped children in the public schools of Wisconsin was investigated, and recommendations for changes and future directions were made. The main body of Brace's 1966 questionnaire was updated, adapted for use in Wisconsin, and sent to 835 randomly selected special education teachers in all cities and communities with programs for mentally handicapped children. Results were based on 346 (41.4 percent) returns; 458 questionnaires (54.8 percent) were not returned, and 31 (3.7 percent) received without requested information or too late to be tabulated. Detailed analyses and recommendations were based on data from these major areas: 1) program information including personnel, organization and administration, curriculum, facilities and equipment, 2) review of sound program practices as recommended by recognized experts, 3) comparison of the status of programs in Wisconsin with recommendations of experts, and 4) suggestions for changes and future directions based on comparisons of existing programs with recommendations of experts. Findings of interest included: 1) 313 (91 percent) of respondents indicated that their schools had student populations consisting of both

mentally handicapped and normal students, 2) 82 percent felt that EMR children could be taught in physical education classes with normal children, 3) 7 percent felt TMR youngsters could be integrated with nonretarded for physical education, 4) 22 percent indicated that EMR and TMR students could be scheduled for physical education, and 5) trends in Wisconsin were toward integrating mentally retarded and normal children for physical education.

294. PYFER, Jean L. *The Effects of Selected Physical Activities on Moderate Mental Retardates' Static and Dynamic Balance.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1970.

In this study an attempt was made to improve static and dynamic balance performances of moderately mentally retarded children (CA 8 to 12; IQ 35 to 59) with a sequential series of balance lessons. A sub-purpose was to suggest activities and rhythms which incorporated balancing tasks and which appealed to children of this age. Three intact classes were assigned treatments at random. Pre and post-study static and dynamic balance performances were measured by a modified Oseretsky Motor Development Scale. One group participated in 40 daily one-half hour experimental physical education lessons; a Hawthorne effect group received 40 daily one-half hour language development lessons and daily one-half hour physical education lessons; a neuromuscular maturation group received no additional attention but participated in one-half hour of daily free play. The first group improved significantly in balance; gains were attributed to tasks included in the experimental physical education lessons. The Hawthorne effect group improved significantly in ability to slide, walk forward and backward, and to hop. The neuromuscular maturational group improved significantly in ability to jump consecutively in one place.

295. RABIN, Herbert M. "The Relationship of Age, Intelligence, and Sex to Motor Proficiency in Mental Defectives." American Journal of Mental Deficiency 62: 3: 507-516, 1957.

This study analyzis previous literature and research dealing with relationships of age, intelligence, and sex to motor proficiency of mentally defective individuals. It was noted that motor skills influenced the emotional well being of children and tended to increase their status position in groups of peers; motor skills were also important to success in certain employment situations. Other observations included: 1) girls usually did poorest on speed items, 2) motor scores at ages four, five, and six varied directly with chronological age, 3) motor proficiency (Lincoln-Oseretsky Motor Development Scale) of mentally defective persons was related to intelligence, and 4) motor proficiency was not found to be a function of sex.

296. RARICK, G. Lawrence. "The Factor Structure of Motor Abilities of Educable Mentally Retarded." Expanding Concepts in Mental Retardation (George A. Jervis, Editor). Springfield, Illinois: Charles C. Thomas Publisher, 1968. pp. 238-251.

This investigation determined the factor structure of motor abilities of a sample of nine, 12 and 14 year old educable mentally retarded boys and girls from intercorrelation matricies of 16 physical growth and motor performance variables. Results pointed to three factors which were common to both sexes at all three age levels: 1) explosive muscular force, 2) static strength, and 3) coordination. Measures of body size loaded consistently on a single factor. Findings indicated that there was a well-defined factor structure of motor abilities in educable mentally retarded children and this structure remained reasonably stable between the ages of nine and 14 with only minor differences between the sexes. The fact that factors similar to those identified in this study had emerged consistently in factor analytic studies on humans of normal intelligence suggested that the basic components of gross motor functions in these mentally retarded children did not differ materially from those noted in children of normal intelligence.

297. RARICK, G. Lawrence. *Research in Physical Education as It Pertains to the Mentally Retarded Child.* Berkeley, California: University of California, n.d.

This article summarizes characteristics of mentally retarded persons as noted through extensive research done by the author. 1) Mentally retarded children lag behind children of normal intelligence in physical growth as they are shorter in stature and lighter in weight throughout the growing years; the greater the mental retardation, the more pronounced the lag in growth. Retarded children are also behind normal children in skeletal maturation and in the onset of sexual maturity. 2) Motor development of mentally retarded children is noticably behind schedule early in life and continues to be behind throughout childhood and adolescence. Educable mentally retarded children are on the average, from two to four years behind normal children of the same chronological age in most gross motor skills. 3) Effects of intellectual factors on gross motor skills vary according to the complexity of motor tasks. This is most evident in complex motor tasks involving sequential movements which require a considerable degree of memory and comprehension. When mental age rather than chronological age is used for grouping, analyzing, and evaluating motor performance data of educable retarded subjects, these children are superior in most motor skills to normal children where mental and chronological ages are consistent. 4) The factor structure of motor abilities of educable

mentally retarded children is highly similar to that of normal children. This indicates that basic components underlying motor performance of these children do not differ materially from those of normal children. Hence, instructional practices used to develop motor skills in these children should be similar to those which have proven effective with children of normal intelligence.

298. RARICK, G. Lawrence. *Special Olympics: Survey of Adult Reactions in Two Metropolitan Areas.* Berkeley, California: University of California, 1971.

Two major purposes of the Special Olympics are 1) to motivate mentally retarded children to lead physically active lives by providing them with athletic experiences similar to those afforded intellectually normal children, and 2) to generate interest at the local level so schools and communities provide quality physical education and recreation programs for these children. This study was designed 1) to develop interview instruments which could be useful in future evaluations of Special Olympics programs, and 2) to secure data from interviews which provided information about the impact of Special Olympics on participants and on physical education and recreation programs for retarded persons. Two metropolitan areas--San Diego, California, and Seattle, Washington--were selected for trying out survey instruments and conducting interviews. A total of 270 parents, teachers, coaches, school principals, and civic leaders were interviewed to determine: 1) how parents of participants viewed the Special Olympics with regard to its effects on the well-being and behavior of their own children, 2) reactions of teachers who had been associated with the Special Olympics, particularly about impact the program had on children from their classes who had participated, 3) reactions of Special Olympic coaches to the program and their impressions of effects of participation on children they had coached, and 4) views of civic leaders regarding impact of the Special Olympics on physical education and recreation programs, facilities, and leadership at community levels. The main body of the study deals with survey procedures, discussions of attitudes and recommendations of parents, teachers, Special Olympic coaches, principals, and civic leaders. Thirteen major findings are summarized and valuable insights into strengths and weaknesses of the Special Olympics are presented.

299. RARICK, G. Lawrence and Geoffrey D. Broadhead. *The Effects of Individualized Versus Group Oriented Physical Education Programs on Selected Parameters of the Development of Educable Mentally Retarded and Minimally Brain Injured Children.* Madison, Wisconsin: University of Wisconsin, August 1968.

This study was designed to investigate the role of educational physical activity programs in modifying motor (AAHPER Special

Fitness Test and selected strength items), intellectual (Bender Motor Gestalt and Peabody Picture Vocabulary), social (sociometry and Cowell Social Behavior Trend Index), and emotional (personality questionnaires and emotional indicators from Bender test protocols) behavior of educable mentally retarded (N=275) and minimally brain injured (N=206) children of elementary school age. Forty nine classes of EMR and MBI children from public school districts participated in 20 weeks of instructional programs. Classes were randomly assigned by disability and age (younger, CA 6 to 9; older, CA 10 to 13) to one of four treatments: 1) individually oriented physical activity programs, 2) group oriented physical activity programs, 3) art programs to assess the Hawthorne effect, and 4) usual instructional program as an experimental control. All programs were taught by classroom teachers for approximately 35 minutes every school day during the 20-week period. Teachers were prepared for teaching and testing programs through in-service meetings. A total of 32 tests, selected to measure the four parameters of behavior, was administered to the children prior to and at the conclusion of the experiment.

The following summarizes findings of the research: 1) children who participated in one of the three specially planned experimental programs exhibited significantly greater positive changes in motor, intellectual, and emotional behavior than children denied these opportunities, 2) of the specially planned experimental programs, physical education programs proved to be superior in modifying motor performance, the art program superior in modifying emotional behavior of younger children, and each program played an equal role in modifying intellectual behavior of the children, 3) the individually oriented physical education program was more successful in eliciting changes in motor, intellectual, and emotional behavior than the group oriented program, and 4) positive changes in behavior occurred more frequently in older than in younger children, more often in MBI than in EMR children, and appeared more likely to occur in boys than in girls.

300. RARICK, G. Lawrence and D. Allan Dobbins. *Basic Components in the Motor Performance of Educable Mentally Retarded Children: Implications for Curriculum Development.* Berkeley, California: University of California, August 31, 1972. Final Report of Project #142714, Grant #OEG-0-70-2568(610), Bureau of Education for the Handicapped, U.S. Office of Education, Department of Health, Education, and Welfare, Washington, D.C.

Purposes of this investigation were to 1) determine factor structure of motor abilities of educable mentally retarded boys

and girls (N=261, CA 6 to 13, IQ 41 to 95) and to ascertain extent to which factor structure differed by chronological age and sex, 2) determine if factor structure of motor abilities of EMR children differed from that of intellectually normal children (N=145) of same age and sex, 3) provide baseline data from which motor performances of EMR children and normal children could be compared, and 4) prepare appropriate guidelines for curriculum development based on findings of the study. After considerable preliminary investigation, 61 tests were selected for the following basic components: static muscular strength, explosive muscular strength, muscular strength-endurance, gross body coordination, cardiorespiratory endurance, limb-eye coordination, manual desterity, static balance, dynamic balance, kinesthesis, flexibility, speed and coordination of gross limb movements, body fat, and body size. Intercorrelations were run and resulting matrices factored on 47 test items sufficiently reliable to be used in final computations.

The 30-month investigation concluded that EMR children were considerably less able in motor tasks requiring elements of muscular strength and power, gross and fine motor control, flexibility, and balance than intellectually normal children of the same age and sex. Reasons for this deficiency were not clear. The fact that on almost all tests some EMR children scored well above the mean of normal children suggested that the deficiency was not solely a function of subnormal intelligence. This was further supported by low correlations between scores on performance tests and IQ scores. Markedly greater deposits of body fat in retarded as compared to normal children were indicative of insufficient physical activity and limited involvement in motor pursuits on the part of retarded subjects. Factor structure of motor performances of retarded children, while differing somewhat by age and sex, was strikingly similar and did not vary greatly from that of normal boys and girls. This suggested that orientation of physical education programs for retarded children need not be materially different from that offered normal children provided consideration was given to retarded motor development and to difficulties many had in comprehending motoric requirements of specific motor skills. Particular attention needed to be given to faulty movement patterns characteristic of many of these children, to their lack of muscular strength and flexibility, and to their limited facility in balance tasks. Individual differences in motor performance of EMR boys and girls were considerably greater than in intellectually normal children. This meant that programs of instruction to be successful with EMR children had to give particular attention to diagnosing individual strengths and weaknesses in the motor domain and result in truly individualized instruction.

301. RARICK, G. Lawrence, Ionel F. Rapaport, and Vern Seefeldt. "Age of Appearance of Ossification Centers of the Hand and Wrist in Children with Downs Disease." Journal of Mental Deficiency Research 9: 24-30; 1965.

The purpose of this study was to observe in children (N=27, boys 16, girls 11; CA 5 to 8 at start of study) having Downs Disease appearance of hand and wrist ossification centers. Roengenograms of hands and wrists were obtained annually on each child for a period of six years. Observations were made on trapezium, trapezoid, and distal epiphyses of the ulna to obtain 1) age of onset of ossification at the three centers in instances when the center appeared after initial x-raying, and 2) bone age of any one or more of the three centers present at the time of the first x-ray. Six years of serial data on these boys and girls indicated: 1) age of onset of ossification of trapezium, trapezoid, and distal ephiphyses was markedly delayed over that of the normal child, 2) nonambulatory children had, for the most part greater delay in ages of ossification at these centers, and 3) children who showed greatest delay in ossification at these centers were most retarded in skeletal age and physical development throughout the six years of the investigation.

302. RARICK, G. Lawrence, Ionel F. Rapaport and Vern Seefeldt. "Bone Development in Downs Disease." American Journal of Diseases of Children 107: 7-13; 1964.

Osseous development of the bones of hands and wrists and stages of pubertal development of mongoloid boys (N=38; CA 7 to 12 at start of study) and girls (N=26; CA 7 to 11 at start of study) were recorded annually over a period of four years. Subjects were residents of two state training schools; all but two subjects were ambulatory at the beginning of the study. Hand and wrist x-rays utilized standard radiographic methods; bone age assessments were made according to procedures devised by W.W. Greulich and S.I. Pyle; stages of pubertal development were assessed according to standards developed by E. Reynolds and J. Wines. Findings indicated: 1) retardation in skeletal maturity in mongolism within the age range studied was more pronounced than earlier studies suggested, and 2) association of the onset of puberty with skeletal maturation in these children was clearly evident and seemed to be similar to the positive relationship observed in normal children.

303. RARICK, G. Lawrence, James H. Widdop, and Geoffrey D. Broadhead. *The Motor Performance and Physical Fitness of Educable Mentally*

Retarded Children. Madison, Wisconsin: University of Wisconsin, 1967.

This investigation was designed to determine motor performance and physical fitness levels of educable mentally retarded children (CA 8 to 18) in American public schools (N=4,235 from 241 schools in 21 continental states) and to develop norms based on the findings. A slightly modified version of the AAHPER Youth Fitness Test was used at all age levels for both sexes. Modifications were made in three of seven tests: 1) pull-up test for boys was changed to flexed arm hang, 2) sit-up test for both boys and girls was changed from number of sit-ups in an unlimited time to number executed in one minute, and 3) 600-yard run-walk was changed for both sexes to 300-yeard run-walk. Shuttle run, standing broad jump, 50-yard dash, and softball throw followed procedures outlined in the AAHPER Youth Fitness Test Manual.

Both boys and girls at all age levels were substantially retarded in mean performances on all test items in comparison with children of normal intelligence. Age-by-sex trends for performances on test items followed the same trends noted in normal children, although retarded children of both sexes were two to four years behind performance levels of normal children of similar age. Sex differences for performances of mentally retarded children were similar to those noted in normal children, boys being on the average superior to girls in all tests at all age levels. Performances of boys were found to increase almost linearly with CA; this is characteristic of boys of normal intelligence. Performance curves of educable retarded girls plateaued at 12 to 13 years of age, following the pattern noted in girls of normal intelligence.

Intercorrelations among physical fitness test items showed that relationships among test items were positive but low at all age levels for both sexes. Except for correlations in the range of .40 to .70 among test items requiring speed of muscular response, almost all others were below .30. Magnitude and pattern of correlations by age and sex were similar to those reported in investigations on children of normal intelligence. Percentile norms were set up separately for boys and girls with children classified according to 1) chronological age, and 2) by a Classification Index. A growth chart is also included, which enables teachers to maintain in graphic form a record of each child's year by year progress on the sevel items.

304. REITAN, Ralph M. "Effects of Brain Damage on a Psychomotor Problem-Solving Task." Perceptual and Motor Skills, April 1958. pp. 211-215.

The major purpose of this study was to compare reliability of differences in performances among persons with and without brain

damage. Another prupose was to determine comparative improvement of one group with brain damaged subjects (N=39; CA $\bar{X}$ 28.3; Education $\bar{X}$ 11.8) and a group with nonbrain damaged subjects (N=39; CA $\bar{X}$ 28.6; education $\bar{X}$ 11.8) on successive but unanticipated repetitions of selected tasks. The Sequin-Goddard form board test, in which subjects were blindfolded and required to use right, left, and both hands to put blocks in place, was administered by five different examiners. Results showed highly significant intergroup difference in amount of time required for each performance of the task as well as for time needed for three trials. Groups were also compared with respect to absolute and proportional amount of improvement on successive trials; both groups showed clear improvement with practice although intergroup differences were not significant.

305. REYNOLDS, William F. and Chalmers L. Stacey. "A Comparison of Normals and Subnormals in Mirror Drawing." The Journal of Genetic Psychology 87: 301-308; 1955.

Relationships between intelligence and mirror drawing ability were analyzed in this study in which subjects were instructed to trace the outline of a six-pointed star while viewing its image in a mirror. Major considerations in this investigation were: 1) mirror tracing speed in seconds, 2) transfer of training, and 3) variability in performance among groups. Subjects (N=168 of whom 108 were subnormal) were divided into three subnormal groups with mean IQ's of 55, 65, and 76; within each group were experimental and control sections of each sex; a group of normal subjects (N=60, male 30, female 30; IQ $\bar{X}$ 103) was subdivided into two control and two experimental sections of each sex. Tests for experimental groups were conducted in the following sequence: 1) one trial with nonpreferred hand, 2) ten trials with preferred hand, and 3) one more trials with nonpreferred hand. Each control subject was given 1) one trial with nonpreferred hand, 2) rest period of about 30 minutes, and, 3) one more trial with nonpreferred hand. Findings showed: 1) in almost every trial, normal subjects achieved greater speed in mirror drawing than subnormal subjects, 2) no consistent sex differences were found in any group, 3) as IQ decreased, subjects took longer to complete the task, 4) all subjects showed the beneficial aspects of experience, and 5) as IQ increased, group coherence in performance increased.

306. RICHARDS, Barbara J. *The Effect of Drownproofing on the Water Survival of Educable Mentally Retarded Boys.* Master's thesis. Whitewater, Wisconsin: The University of Wisconsin at Whitewater, 1973.

This study was designed to investigate effects of instruction in drownproofing on survival ability of educable mentally retarded

boys. Two pre-established swimming classes were assigned by chance to different treatment groups: 1) drownproofing instruction (N=19; CA 13-2 to 15, $\bar{X}$ 14; IQ 60 to 85, $\bar{X}$ 73.5) and 2) traditional Red Cross instruction (N=14; CA 14-3 to 15-11, $\bar{X}$ 14-9; IQ 62 to 82, $\bar{X}$ 74.1). Pre- and post-evaluations were based on the ability of each student to support himself in deep water as long as possible with a maximum time of five hours. Each group received 20 training sessions in three 35-minute lessons per week over a nine week period.

Although the drownproofing group surpassed the Red Cross instructional group on pre, post, and change socres, no differences were significant. Supplementary finding based on 1) mean gains in floating time, 2) number of students learning to float, and, 3) survival time for one hour suggested that 1) teaching drownproofing to mentally retarded students piror to formal swimming instruction might have distinct advantages, and 2) downproofing should be an integral part of any swimming program for mentally retarded persons.

307. RICHEY, Gary L. *A Survey of Recreational Programs Offered in State Institutions for the Mentally Retarded in the Midwestern States During the Year 1968-1969.* Master's thesis. Springfield, Missouri: Southwest Missouri State College, 1969.

Questionnaires were mailed to recreational directors of 35 state institutions for mentally retarded persons in nine midwestern states (Missouri, Illinois, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, South Dakota, and North Dakota) to determine outdoor and indoor recreational activities, group and club opportunities, holiday programs, and types of field trips available to educable, trainable, and custodial residents. The 34 (97.1 percent) replies indicated a wide varity of recreational activities offered at these state facilities with more programs aimed at and for educable and trainable persons than for custodial residents.

308. ROSEN, Ann, Alice Taylor and Carl A. Wilson. *A Visual and Motor Coordination Program for Educable Mentally Retarded Children.* Wilmington, Delaware: Delaware Foundation for Retarded Children, June 1970 and 1971. (Information from Delaware Association for Retarded Children, P.O. Box 1896, Wilmington, Delaware 19899.)

In this two year project, training began with elementary gross motor activities--general coordination with floor movements, balance activities, chalkboard tasks--and advanced systematically to fine fusion exercises. The second year combination of visual examination and training plus motor co-

ordination resulted in all children demonstrating higher degrees of improvement in all areas tested. Assessment instruments included Purdue Perceptual Motor Survey, Winterhaven Perceptual Form Test, and Telebinocular Tests. Subjects consisted of three primary (CA 6-3 to 12-10) and two intermediate (CA 10-3 to 13-6) classes of mentally retarded youngsters enrolled in River Road, Claymont, and Alfred I. du Pont Schools (Wilmington, Delaware). Results also suggested that if a choice of activities must be made, visual perception should be emphasized if the desired result is academic progress, while preference should be given to motor coordination if the program objective is to improve physical appearance and dexterity. Special emphasis was given to the importance of complete cooperation and participation of both parents and classroom teachers for the overall success of the program.

309. ROTMAN, Charles. *A Study of the Effect of Practice Upon Motor Skills of the Mentally Retarded.* Doctoral dissertation. Boston, Massachusetts: Boston University, 1963.

This study was designed to 1) evaluate effects of practice on ability of mentally retarded patients (N=80; IQ 50 to 75; CA 18 to 30) to perform skills of motor coordination, manual dexterity, and finger dexterity, and 2) to determine if patients could perform these skills at levels comparable to those achieved by the general working population (N=100; CA 18 to 32); relationship of intelligence (Stanford Binet) to each of the motor skills was also assessed. Evaluative instruments were adapted from the General Aptitude Test Battery (GATB) and consisted of 1) pegboard place and turn tests (manual dexterity), 2) assemble and disassemble tests (finger dexterity), and 3) a test in which two vertical lines and one horizontal line were drawn beneath a series of squares (motor coordination). Mentally retarded subjects were divided into experimental (N=40; IQ $\bar{X}$ 62.6; CA $\bar{X}$ 23-3) and control (N=40; IQ $\bar{X}$ 62.6; CA $\bar{X}$ 23-1) groups. The experimental group was further divided into three subgroups for practice on work tasks; each group practiced once per day for two, five, and seven days respectively. Findings revealed: 1) no significant differences in any of the motor skill measures according to amount of practice although practice on work samples did improve posttest performances of all three subgroups, 2) working population scored significantly better than experimental and control groups on both pre and posttests, 3) low but significant correlations between intelligence and each measure of motor skill, and 4) generally, practice appeared to have a positive influence on performances of these mentally retarded patients.

310. ROYER, Donald. *A Comparison of the Maximal Oxygen Intake of Educable Retarded Children and Children of Low Normal Intel-*

lectual Ability. Master's thesis. University Park, Pennsylvania: Pennsylvania State University, 1970.

Comparisons were made of maximal oxygen intake of educable mentally retarded children and children of low normal intellectual ability. Performances of subjects (N=162; CA 6 to 16; IQ 50 to 114) were evaluated by progressive walking tests on a treadmill. Each child was tested once by one of three methods to determine his maximum oxygen uptake: 1) two minute continuous test, 2) three minute continuous test, and 3) four minute intermittent test. No significant differences in maximum oxygen uptake between educable retarded children and children of low normal intellectual ability were found. Values obtained were comparable with previous studies in which normal children were used as subjects. Significant differences were found among age groups when maximum oxygen uptake values were expressed in liters per minute but there were no differences among age groups when maximum oxygen uptake was expressed in milli-liters per killogram minutes.

311. SALVIN, Sophia T. "Program for Severely Mentally Retarded Pupils." American Journal of Mental Deficiency 63: 2: 274-281; September 1958.

This article describes and evaluates camping and scouting programs conducted by public recreation agencies for children, youth, and adults with severe physical and mental handicapping conditions.

As a result of the initial work a community committee on Recreation for the severely mentally retarded was formed. The first recreational service provided by this committee was a Happy Time Summer Day Camp for 31 youngsters. These children were divided into three groups--primary, intermediate, and upper--with each group participating in from five to ten different activities. General observations made by camp counselors indicated: 1) responsiveness of the children to these activities was excellent, 2) a great deal of sharing, helping others, and wholesome striving to do as well as possible in addition to healthy interaction among all three groups was noted, 3) swimming and wading were most popular activities, 4) retarded youngsters were highly motivated to participate in recreational activities, 5) recreational performances of these retarded children were related to their mental and emotional ages rather than to chronological age, and 6) retarded participants had to be taught how to play step by step.

The committee also organized a scouting program in which 17 boys and 14 girls became involved in Cub Scout, Boy Scout, Brownie, and Girl Scout activities. Scout leaders modified some Cub and

and Brownie activities to conform to physical, emotional, and mental needs of these retarded children. Among the conclusions drawn from these scouting experiences were: 1) a variety of recreational experiences had to be provided to meet the different needs of these youngsters, 2) a recreational program was good for clinical observation, 3) scouting was a valuable educational tool for these students, 4) activities helped these children respect rights of others, 5) participation aided them in taking defeat and victory in stride while engaging in competitive activities, 6) it enabled them to enter into a daily life pattern or routine. Many recommendations were listed to help others in setting up recreational programs for severely retarded persons.

312. SATTLER, George and Robert H. Cassel. "Tactual-Kinesthetic Localization in the Mentally Retarded." American Journal of Mental Deficiency 59: 652; April 1955.

This study was concerned with errors of tactual-kinesthetic localization in mentally retarded children. Residents of a state training school were divided according to origins of their disorders: 1) psychogenic, 2) hereditary of familial, and 3) brain damaged--into three groups of 20 boys each; a fourth group consisted of 20 students of comparable chronological ag[illegible] from a local public school. All subjects received a standar[illegible] stimulus on six skin areas. Findings indicated: 1) errors of localization were largest among brain damaged children and smallest among normal youngsters with errors of psychogenic and familial subjects falling in between, 2) patterns of scores earned by both retarded and normal groups were essentially the same and conformed to expectations, 3) subjects with organic conditions failed to show effects of distractibility and high mobility in their test performances, and 4) correlations between right and left hemispheres supported hypotheses that brain damage was likely to be confined to a particular cerebral region.

313. SAVA, Lawrence Eton. *The Effects of a Consultant Physical Education Program on the Physical Fitness of Educable Mentally Retarded Children.* Master's thesis. Lubbock, Texas: Texas Technological College, August 1968.

This study purported to determine effects of a physical education progr m planned and prepared by a special consultant on levels of physical fitness of educable mentally retarded children (N=21; IQ 50 to 75; CA 9 to 12). The program--eight weeks, five days per week, half-hour sessions--involved a consultant trained in physical education for mentally retarded children and a classroom teacher with training

in special education but with no formal training in physical education. The experimental group (boys 16, girls 5) participated in a physical education program developed by the consultant and implemented by the classroom teacher. The control group (boys 7, girls 3) participated in a program best described as free non-directed play. The AAHPER Special Fitness Test for mentally retarded children and youth was administered to both groups before and after the special program. The experimental group improved significantly only in sit-up and 300-yard run-walk test items; the control group showed no significant changes in any of the seven test items. No significant differences were found between the two groups on any of the test items or on composite scores of all items.

314. SAYAH, James. *A Study of Physical Education Programs for the Educable Retarded in the Greater Seattle Area.* Graduate Research paper. Seattle, Washington: Seattle Pacific College, 1966.

Existing physical education programs for educable mentally retarded children in seven Greater Seattle, Washington, school districts were evaluated to determine how they related to recommended guidelines provided by two local authorities; interview techniques were used to gather data. The following facts were discovered: 1) all districts had physical education programs for educable mentally retarded children, 2) some districts provided physical education on a daily basis for these children, 3) some schools grouped educable and normal children together for physical education, 4) some schools offered intramural, recreational, and interschool sports programs for these children, 5) special education staff members recognized values of physical education for their students and supported these programs, 6) elementary level special education teachers had little background in physical education; intermediate level special education teachers were a little better prepared, and physical education specialists worked with older children, and 7) few teachers at any level had taken professional courses in adapted physical education. These suggestions were made for improving physical education programs for mentally retarded subjects: 1) provide better gymnasiums, multi-purpose rooms, and play areas, 2) give teachers more and better equipment and supplies, 3) improve planning and set-up committees consisting of principals, school nurses, and adapted physical educations specialists to facilitate establishment of new goals, objectives, and programs, 4) expand programs and provide more vigorous activities, 5) provide better evaluative criteria through use of skills and fitness tests, 6) employ adapted physical education specialists to conduct these programs.

Recommendations by school district personnel included: 1) expand and improve activities, facilities, and equipment, 2) increase number of therapists involved in programs, 3) make better use of community resources, and 4) offer better in-service training in cooperation with members of special education staffs.

315. SCHEER, R. M. and W. M. Sharpe. "Social Group Work in Day Camping with Institutionalized Delinquent Retardates." Training School Bulletin 60: 138-147; November 1963.

This study reports an attempt to treat institutionalized mentally retarded persons through social group work and day camping experiences. Subjects (N=60; CA 14 to 22) participated for nine months in small group (6 to 10 per group) sessions with three social workers. Prior to day camp subjects were divided into two groups based on homogenity, age, functioning level, and social maturity. Each group attended day camp on two alternate days per week--Mondays and Wednesdays or Tuesdays and Thursdays--for eight weeks; Fridays were set aside for psychiatric consulations, and individual conferences. Results showed: 1) reduction in delinquent behavior, 2) development of cooperative attitudes, and 3) identification with staff by subjects. Major conclusions included: 1) ratio of one staff member per six or seven campers was realistic, 2) this program had limited retention and carry-over value, 3) an eight week day camp was too long for these subjects, and 4) the total institution needed to be involved in such a program.

316. SCHORSCH, Sister M. Josepha. "Music Therapy of the Physically or Mentally Handicapped Child." Education, March 1950.

This study was designed to determine if music had beneficial effects on physically and mentally handicapped children. Music had been observed to have great value to exceptional children. Results of experiments with children with cardiac conditions, Perthe's Disease, tuberculosis, and other handicapping conditions showed that music helped compensate for these deficiencies, promoted endurance, and encouraged patience. Music also contributed to academic and social development of mentally deficient children. Both physically and mentally handicapped youngsters welcomed music as an avenue of expression and as a much needed emotional outlet. Music had definite therapetuic functions in helping handicapped children.

317. SCHREIBER, M. *Community Recreation Resources for the Mentally Retarded.* New York, New York: Association for the Help of

tarded Children, May 1964.

In this study the investigator sought to show that mentally retarded persons benefited from 1) participating in neighborhood agency social and recreation programs, 2) taking part in leisure time activities, and 3) significant changes resulted in social competence, ability to live with one's family, and in community activities from acquiring skills through participating in such programs. Agencies were contacted and agreed to make facilities, staff, and resources available to mildly and moderately retarded subjects (N=300 to 350; CA 8 to 50) who were after careful screening selected to participate in this project. Parents submitted background information in writing and were also interviewed. Subjects were then grouped homogeneously in terms of chronological age, past experience, education, and level of functioning. Subjects selected for integration into normal groups were placed with persons younger than themselves. Groups met once or twice a week depending upon individual agency policies; they had access to staff and facilities at other times. Programs were structured, had varied content, and emphasized fun, development of social skills, and increased independence. Based on the 15-month study it was found that: 1) primary factor for success was willingness of agency personnel to participate whole heartedly in the program, 2) mental retardation, uncomplicated by other conditions, presented no major difficulties to group leaders or agencies, 3) each subject as a result of careful grouping and screening was individually placed in either a peer group of retarded participants or integrated with a group of nonretarded persons, and 4) effects of retarded persons upon normal groups were positive while reciprocal effects of nonretarded persons on retarded participants were also positive. The researchers concluded that both specialized and general agencies made significant contributions toward enriching experiences of individual retarded persons and their families with respect to use of leisure time, socialization, and utilization of community resources.

318. SCOTT, Robert Sparing. *Acquisition, Retention and Relearning of a Gross Motor Skill with Normal and Retarded Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1971.

This study was designed 1) to compare abilities of normal and retarded children in learning balancing skills on a stabilometer and 2) to determine effects of 50 percent additional learning on retention and relearning of these skills after a 28-day period of no practice. All calculations were made using mean scores for each child (N=36) for each block of four trials; groups were compared in acquisition, retention, and relearning. All subjects improved at a similar rate during learning blocks, with retarded

children significantly lower in performances. There was no difference noted in ability to retain these skills after 28 days without practice. Normal children performed at a higher level and learned at a faster rate during relearning blocks. Relationships between performances on the stabilometer and IQ were higher for retarded children. Distribution of performances of retarded children fell within the range of performances of normal children.

319. SCOTT, W. S. "Reaction Time in Young Intellectual Deviates." Archives of Psychology 36: 256; 1940.

Purposes of this study were to determine whether children with high IQs differed from those with low IQs 1) in speed and variability of reaction and 2) in relative decrease in speed accompanying increase in number and complexity of arrangement of potential stimuli. Fifty-one children with IQs between 120 and 200 (Stanford Binet) were compared with 49 children of the same chronological age with IQs between 63 and 94. Testing equipment consisted of a box-like apparatus with five response keys arranged in an arc so that its radius was distance from the finger-rest to the center of the button of any response key. Keys were directly beneath one of five one-watt neon bulbs which served as stimuli. Results indicated: 1) boys with high IQ's surpassed those in the low IQ group on all tests for speed of reaction, 2) girls with high IQ's were faster than those with low IQ's with differences between these groups less marked on simplest tasks than on those in which several potential stimuli were used, and 3) not only were high IQ groups faster than respective low IQ groups, but in general both high IQ groups surpassed either of the low IQ groups in speed of reaction.

320. SEEFELDT, Vernal D. *A Longitudinal Study of Physical Growth and Development in Down's Syndrome.* Doctoral dissertation. Madison, Wisconsin: University of Wisconsin, 1965.

In this study data collected annually over an eight-year period included selected anthropometric measures, roentgenograms, signs of pubertal development, and x-ray assessments of skeletal maturity of children with Down's Syndrome; normative data were used for comparisons. Children with Down's syndrome were significantly retarded in all phases of linear growth although sex differences in magnitude and direction of linear growth were similar to those of normal children between seven and 18 years of age. Onset of puberty produced growth changes in these children similar to those in normal children. Retardation in bone and muscle tissue was

substantial but percentage of adipose tissue was greater than in normal children.

321. SEEGERS, J. C. and Otto Postpichal. "Relation Between Intelligence and Certain Aspects of Physical Ability." Journal of Educational Research 30: 2: 104-109; October 1936.

This study provided information about correlations between IQ and scores in each of five athletic events. Subjects (N=656 boys) attended one of two special schools in Philadelphia. An IQ score for each boy was obtained from offices of Philadelphia schools and then each boy was tested in the following events: standing broad jump, overhead ball throw, 50-yard dash, standing hop-step-jump, and chinning; the better of two trials was recorded and tests repeated twice at intervals of one month. Analyses showed: 1) correlations between scores in athletic events and IQ were positive but too low to be of much predictive use, 2) correlations with IQ were higher for the more complicated athletic events (i.e., events requiring use of more muscle groups in which greater coordination was needed), 3) brighter boys tended to achieve better scores on athletic events, and 4) individual variations were so great and forecasting utility so small that observed tendencies were not recommended for individual application.

322. SEMBER, Andrew T. "A Critique of Summer Recreational and Crafts Activities for Mentally Retarded Children." The Training School Bulletin 54: 3: 37-47; November 1957.

This article describes the format of a nine week summer recreational program for a large group of mentally retarded residents (boys CA 5 to 55, MA 2 to 11; girls CA 5 to 35, MA 2 to 12) in a state training school. Needs of the residents were set as goals for the program: 1) provide enjoyable and meaningful activities, 2) develop skills in carryover activities, 3) develop skills in activities that provide a source of pleasurable relaxation and accomplishment, 4) develop, through activities, greater appreciation of both activities and the performer by means of participation, and 5) provide outlets for latent energy through physical activities. Cottages in which participants lived were grouped into playgrounds with each playground consisting of cottages of close chronological and mental ages. Playgrounds consisted of seven groups: 1) nursery, 2) primary-hyperactive boys, 3) teenage girls, 4) teenage boys, 5) physically skilled boys, 6) older-lower mental age girls, and 7) mongoloid boys. Varied activities in crafts and swimming, plus special events--water carnival, trips and outings, evening entertainment in the assembly hall--were presented to participants. Groups were small in number and

activities fitted to abilities of participating group.

Four primary conclusions were derived: 1) normal activities could be used if altered or modified to fit capabilities of participants, 2) retarded residents were capable of participating in and benefiting from a planned summer recreation program, 3) retarded residents derived normal benefits of good sportsmanship, fair play, acceptance by peers, development of emotional control, development of neuromuscular skills, and learning qualities of leadership, and development of organic fitness, 4) competition for the sake of winning had to minimized, and pleasure of participating magnified.

323. SENGSTOCK, Wayne L. *A Comparison of the Performance of EMR Boys with Performance of Intellectually Normal Boys on AAHPER Youth Fitness Test Battery.* Doctoral dissertation. Syracuse, New York: Syracuse University, June 1963. See article, "Physical Fitness of Mentally Retarded Boys," The Research Quarterly 37: 1: 113-120; March 1966.

Thirty educable mentally retarded boys (CA 10-11 to 15-4; IQ 60 to 80, MA 7-5 to 12-3) were compared with 30 intellectually normal boys of comparable chronological age (old normal CA 10-9 to 15-2; IQ 92 to 107; MA 10-0 to 15-10), and with 30 intellectually normal boys of comparable mental age (young normal CA 6-11 to 11-7; IQ 91 to 110; MA 7-3 to 12-2) in performances on AAHPER Youth Fitness Test. Subjects were selected from five public schools in such a way that the two normal groups came from the same schools as their matched EMR counterparts; there were no significant sociometric (Warner's Index of Status Characteristics) differences among groups. Pertinent findings included: 1) physical fitness scores of EMR boys were inferior ro those of the old normal group--analyses resulted in significant differences for all test items except for raw and percentile comparisons of pull-ups and for percentile comparisons of the 50-yard dash, and 2) physical fitness score of the EMR boys were superior to those of the young normal group--analyses resulted in significant differences for all test items except sit-ups in which young normals surpassed the EMR group, and for pull-ups. Generally, performances of the EMR group was almost midway between mean performances of old normal and young normal groups.

324. SHANNON, Charley H. *Heart Rates of Three Age Groups of Normal and Mentally Retarded Boys.* Doctoral dissertation. Austin,

Texas: University of Texas, 1970.

The purpose of this study was to compare resting, anticipatory, and recovery heart rates, and excerise times of boys with normal intelligence (N=45) with trainable mentally retarded boys (N=40); subjects in both groups were divided into three subgroups based on chronological age. Two electrodes were affixed to the chest as leads to a battery-operated, transistorized cardiotachometer to record heart rates prior to, during, and after a graduated exercise performance on a treadmill. Heart rate of each subject was recorded for five minutes at 30-second intervals while he rested; the last 30 seconds of the resting period was preceded by vocal and mechanical stimuli to induce an anticipatory heartbeat. Then the subject walked on the treadmill at a rate of 3.5 miles per hour--for the first two minutes the elevation remained level; thereafter, the treadmill was elevated two percent per minute. Each subject remained on the treadmill for a maximum of 12 minutes unless his heart rate reached 170 beats per minute; total exercise time was recorded. Upon completion of exercise each subject returned to a resting position on a table and recovery heart rate was recorded. Analyses showed: 1) performance times of 15-year-old retarded boys were significantly less than exercise times of all three groups of normal subjects; 2) heart rates of 13-and 15-year old normal subjects recovered significantly more rapidly than heart rates of the retarded boys of the same age groups; 3) increase in age did not result in any significant differences in heart rates of retarded subjects; 4) age of normal subjects did not result in any significant differences in resting or anticipatory heart rates or in exercise time; 5) significant differences were found between groups of normal subjects in recovery heart rate at several intervals; 6) within the limitations of the sample studied, results indicated that these retarded boys gradually fell behind normal subjects in measured heart rates, and 7) by the fifteenth year capacity for exercise and recovery ability after exercise for these retarded boys were significantly different from that of normal subjects.

325. SHARPE, Gary D. *Effectiveness of Specified Physical Education Programs and Establishment of Selected Motor Performance Norms for the Trainable Mentally Retarded.* Doctoral dissertation. Columbia, Missouri: University of Missouri, 1968.

Purposes of this study were 1) to determine whether selected physical education programs could effect motor performance gains by trainable mentally retarded children, and 2) to establish normative levels of performance by trainable mentally retarded

subjects with respect to selected perceptual-motor activities. Three separate populations were defined for this study from state schools for trainable mentally retarded in St. Louis, Springfield, and North Kansas City. A random sample of 80 students, divided into four groups of 20 each, constituted the sample drawn from the St. Louis population. Three of these four groups were subjected to independent physical education programs over a period of 15 weeks; the fourth was a control group. Non-random samples of 34 and 37 were selected from populations of Springfield and North Kansas City respectively. Both of these samples were divided into experimental control groups with the latter receiving no physical education. To establish normative levels of motor performance by trainable mentally retarded subjects, means and standard deviations were computed in four age groupings --6 to 8, 9 to 11, 12 to 15, 16 to 19--on 311 individual items of three test criterion instruments: Purdue Perceptual-Motor Survey, Godfrey-Thompson Movement Pattern Checklist, and Hayden's Physical Fitness Test for the Mentally Retarded. Within the limitations of this study, it was concluded that: 1) physical education programs effected significant differences in motor performance gains by these trainable mentally retarded subjects, 2) various physical education programs specifically designed for this study to improve basic motor skills appeared equally efficient in effecting motor performance gains by these trainable mentally retarded subjects, and 3) motor performance levels of trainable mentally retarded children tended to decrease sharply following the primary years (6 to 8) and, then, gradually increased through young adulthood (16 to 19) reaching a level similar to that of the primary years or increased steadily from primary years through young adulthood.

326. SHOMAN, Alice Mae. *Movement Patterning of a Motor Skill.* Doctoral dissertation. Salt Lake City, Utah: University of Utah, 1966.

Primary purposes of this study were to: 1) determine whether mentally retarded children improved their performances in a selected motor skill--ball rolling, 2) determine whether movement patterning was more effective than conventional methods in teaching mentally retarded children to perform the specific movement skill, and 3) explore effectiveness of movement patterning procedures for these youngsters. Secondary purposes were designed to: 1) determine whether improvement in performance of a selected motor skill--ball-rolling--lead to improvement in a related but unpracticed motor skill--underhand throwing, 2) explore relationships between performances in ball-rolling

and age, intelligence, and social maturity, and 3) ascertain differences between boys and girls in performances of motor skills. Subjects (N=28; CA 7 to 13) from a state school for mentally retarded residents were pretested on ball-rolling and underhand throwing tests for accuracy; they were placed in two groups based on motor skill pretest, age, IQ, and social maturity scores. Group A was taught by a special education teacher using conventional methods; Group B was taught by the researcher using patterning methods designed to facilitate purposive movement sequences and to eliminate erratic uncontrolled movements. Children in each group met with their instructors on an individual basis for six consecutive days and received instruction in rolling a ball ten times. At the end of the third lesson, children were again tested for accuracy in ball-rolling; at the end of the six lessons, ball-rolling and underhand throwing for accuracy tests were repeated. Findings showed: 1) children improved significantly in ball-rolling as measured by an accuracy test, 2) the conventional teaching approach appeared more effective than the patterning approach, 3) improvement in ball-rolling performances did not result in improved performances or accuracy in underhand throwing, 4) no significant relationships were found between performance of ball-rolling and age, intelligence, or social maturity, and 5) no differences were indicated between performances of boys and girls in either ball-rolling or throwing for accuracy.

327. SHOTICK, A. and C. Thate. "Reactions of a Group of Educable Mentally Handicapped Children to a Program of Physical Education." Exceptional Children, January, 1960. pp: 248-252.

This preliminary investigation attempted to evaluate reactions of seven mentally retarded children to organized physical education programs. Responses were categorized according to level of enthusiasm for each activity, degree to which instructions were followed, and interaction among children during activities. Although the scoring scale permitted little variability (one to three), results in all categories were positive. Based on their findings, the authors listed concrete and practical guidelines and suggested teaching pointers to consider when setting up physical education programs for mentally retarded children: 1) begin with simple activities such as relays, dodgeball, tag games, simple stunts and tumbling tasks, and progress to more difficult activities as the group demonstrates its abilities, 2) emphasize activities that hold the children's attention and enthusiasm, 3) do not allow unsuccessful attempts to teach rhythmic activities to deter continuing a rhythmic program, 4) manipulate a child's body through a given sequence for skill

activities, such as stunts and tumbling, 5) plan for more than one activity during a period when including games in these physical education programs, and 6) explain and demonstrate rules and other factors about play situations.

328. SLOAN, William. "Motor Proficiency and Intelligence." American Journal of Mental Deficiency 55: 394-406; January 1951.

Two groups of 10 year-old students (N=40; feebleminded 20, IQ 45 to 70; normal 20, IQ 90 to 110) were given the Lincoln Adaptation of the Oseretsky Tests of Motor Proficiency, 1937 version of Stanford-Binet test, and Vineland Social Maturity Scale. Correlation of each of the six subtests of the Oseretsky Tests with IQ scores indicated: 1) motor proficiency was related to intelligence, 2) mentally defective children performed best on measures of precision of movement or lack of surplus movement (synkinesia) and poorest in simultaneous movement, 3) sex differences and clinical classifications were not related, and 4) normal children rated significantly higher on the Vineland Social Maturity Scale. Findings suggested that evaluations of motor proficiency and social maturity as well as estimates of intelligence should be considered when evaluating adaptive capacity of children.

329. SLOAN, William and Irwin A. Berg. "A Comparison of Two Types of Learning in Mental Defectives." American Journal of Mental Deficiency 61: 3: 556-566; January 1957.

The feasibility of using two techniques for studying learning processes of mentally defective subjects (N=32 white residents of a state training school, males 17, females 15; CA 10 to 30, $\bar{X}$ 17.7; MA $\bar{X}$ 8.2; IQ $\bar{X}$ 57) was analyzed in this investigation. Each subject was given a revised Stanford-Binet, Word Learning Test, and a standard stylus maze test; the Word Learning Test was essentially for cross-valadation purposes. Relationships of each of these tasks to each other and to mental age were made and showed: 1) Word Learning Test appeared to be an acceptably reliable technique for studying learning of mentally defective persons, 2) learning curve on the maze test was quite typical and reliable at an acceptable level for this type of task, 3) correlations between Word Learning Scores and mental age were significant, 4) correlations between gain scores and mental ages were significant, 5) no significant relationships between maze learning and mental age were noted, 6) curves for word and maze learning corresponded closely to each other when plotted as group averages, and 7) when scores for these two tasks were correlated on an individual basis, degree of relationship was not significant.

330. SMALLEY, F. K. "Physical Education for the E.S.N. Boy." Special Education, Summer, 1965. pp. 11-12.

This dual purpose study was conducted to determine (1) whether physical education facilities in schools for educationally subnormal E.S.N. boys in England were adequate, and 2) whether E.S.N. boys were as strong, fast, or well coordinated as normal boys. A questionnaire was sent to 271 schools in England and Wales to obtain information about qualifications of members of physical education staffs, availability of gymnasia and other facilities, types of physical education activities offered, and reasons these kinds of activities had been chosen; usable replies were received from 200 schools (74.5 percent). Findings indicated: 1) a shortage of qualified personnel and facilities for these programs, 2) a majority of schools had programs which stressed such physical motor elements as vaulting, agility, strength, and mobility, 3) all but one school designated soccer as its major game, and 4) these students performed in athletics (gymnastics) swimming and cross-country.

Three groups of six boys each from 1) a secondary modern school, 2) a residential school for E.S.N. students, and 3) a day school for E.S.N. students were tested for strength, speed, coordination, stamina, standing jumps, and questioned about their attitudes toward physical education. Results showed that boys from the secondary modern school performed best, followed by those from the residential school, with students from the day school doing poorest. Most boys from the secondary modern school showed a positive attitude toward physical education while a number of E.S.N. boys had negative responses indicating apathy and even positive dislike for physical education.

331. SMITH, Etoyal G. *A Comparison of Two Methods of Teaching Motor Skills to Trainable Retarded Children.* Doctoral dissertation. University, Alabama: University of Alabama, 1969.

This study was conducted to determine effectiveness of two methods of teaching selected motor skills to trainable mentally retarded children: 1) conventional means of teaching motor skills were used with a control group and 2) techniques used with the control group in addition to video feedback were used with two experimental groups; these two groups received video feedback during each class period. Subjects (N=27) were enrolled in the academic school program at a state school and hospital for mentally retarded persons.

Three units of activities were used in the study: I - skills in walking a balance beam forward, sideward, forward carrying an object, and backward; II - an obstacle course involving stepping in boxes, stepping over a low hurdle, and crawling under a high hurdle, and

III - throwing, catching, bouncing, and bowling a ball. Pre and postperformances of each subject were recorded on videotape for each of the three units. Scoring for each unit was based on evaluations of three teams of experts who rated both pre and postperformances of each subject. Comparisons were made to determine improvement between groups in each unit. In addition, this study provided an opportunity to analyze the validity of ratings of evaluation teams by comparing scores of the three teams against each other for differences.

The following were major findings: 1) no significant differences were found in improvement of skills from pre to postperformance for any of the three units as a result of the experimental treatment, and 2) the three evaluating teams were consistent in their ratings of all three groups in balance; however, some inconsistencies appeared in ratings of obstacle course and ball handling units.

332. SMITH, John G. and Myrtle K. Rice. "Swimming Pool Survey." M.R. Journal, June 1965.

This study reported findings of a survey of public institutions for mentally retarded persons to determine 1) number having swimming and/or wading pools, 2) cost of constructing these pools, and 3) methods of financing pool construction. In 1963 approximately 40 percent of public institutions for mentally retarded persons had swimming pools of varying sizes, with about three-fourts of them located out-of-doors. Although almost a third of all the pools were completely financed by the state, they were most generally built by parents and friends. Other sections of this report deal with amount and types of equipment found in different pools, modifications to accommodate persons with various physical impairments, lifeguards, rules, accidents, and use of pools by persons other than residents.

333. SOLOMON, Amiel H. *Motivational and Repeated Trial Effects on Physical Proficiency Performances of Educable Mentally Retarded and Normal Boys.* Doctoral dissertation. Nashville, Tennessee: George Peabody College, 1968. (Published as *Behavioral Science Monograph Number 11,* Nashville, Tennessee: George Peabody College, Institute on Mental Retardation and Intellectual Development, 1968.)

This study was designed to assess effects of different motivational incentives on physical proficiency of educable mentally retarded and normal boys over a series of repeated trials. Subjects (N=81; CA 14-0 to 16-11) included two groups of educable mentally retarded boys (public school and insti-

tutional; IQ 51 to 80; MA 6-7 to 12-2) and one group of normal males (IQ 89 to 123; MA 12-11 to 18-3). Each main group was randomly subdivided into three subgroups of nine each so that three motivational incentives could be applied 1) basic motivation (BM), 2) continuous verbal encouragement (CVE), and 3) continuous verbal encouragement plus monetary reward (CVEMR). Monetary reward was based upon a graduated scale and amount received (five to 15 cents) depended upon extent of improvement over a previous best performance. Each subgroup received ten trials on each of five physical proficiency items 1) standing broad jump, 2) shuttle run, 3) bent arm hang, 4) 50-yard dash, and 5) softball throw for distance.

In evaluating results, the following conclusions seemed justified: 1) the kind of motivational incentive was important to EMR and normal boys as CVE and CVEMR incentives were superior to BM incentive for both EMR and normal groups. Although the highest incentive (CVEMR) demonstrated significance over CVE incentive for EMR boys, this was not the case for normal boys who responded equally well to both CVE and CVEMR incentives. 2) Performances of normal boys were superior to those of EMR boys regardless of motivation; with only two exceptions these differences were significant. 3) Monetary reward incentive (CVEMR) elicited best performances for both EMR groups. Since this was not the case for normal boys, this finding supported the feeling that EMR boys were more highly attuned to material rewards than normal boys. 4) Performances of institutionalized mentally retarded boys, although inferior to those of normal subjects, were superior to those of public school retarded boys with material incentive (CVEMR). Although there was similarity in performances under BM and CVE incentives for the two EMR groups, this was not observed for CVEMR incentive. Performances of the institutionalized group significantly surpassed those of public school retarded boys in the standing broad jump, bent arm hand, and 50-yard dash; differences were not significant in the shuttle run and softball throw. 5) Although on the average no group reached its peak performance before the third trial, trends were not significantly different between EMR and normal subjects. Analyses divulged that multiple trials, on the whole, were helpful to both EMR and normal boys; for certain items, performances continued to improve as late as the tenth trial; analyses revealed a linear statistical relationship for both groups in a majority of instances.

334. SOLOMON, Amiel H. and Roy V. Pangle. "Demonstrating Physical Fitness Improvement in the EMR." Exceptional Children, November 1967. pp: 179-181.

This study was designed to assess changes in physical development of educable mentally retarded boys as a result of participating in a structured physical education program. Subjects (N=42; experimental 24, control 18; IQ 49 to 85 X 66.8; CA 13-5 to 17-3; MA 7-2 to 12-2), enrolled in one of four classes for educable mentally retarded boys

in a metropolitan school system, were given three items from the AAHPER Youth Fitness Test (pull-ups, sit-ups, 50-yard dash); scores on these three items were used to predict an average score for each subject on the total AAHPER Battery. Members of the experimental group participated in a daily 45-minute physical education program for eight weeks. Each period consisted of approximately 15 minutes of warm-up exercises and calisthenics, 15 minutes of self-testing, dual, and relay activities, and 15 minutes of skill instruction, stunts, and tumbling. As a result of posttest and follow-up data obtained six weeks after the experimental period ended, the investigators concluded: 1) levels of physical fitness were significantly improved so as to allow for favorable comparisons with nonretarded children, and 2) significant gains demonstrated at the end of the experiment remained significant over a six-week post experiment follow-up period.

335. SOLOMON, Amiel H., and Roy V. Pangle. "The Effects of a Structured Physical Education Program on Physical, Intellectual, and Self-Concept Development of Educable Retarded Boys." Behavioral Science Monograph Number 4. Nashville, Tennessee: George Peabody College, Institute on Mental Retardation and Intellectual Development, 1966.

Changes in self-concept and in physical and intellectual development of educable mentally retarded boys as a result of participating a structured physical education program for eight weeks were assessed. Four intact groups from special day classes for educable mentally retarded boys (N=41; CA 13-5 to 17-4; IQ 47 to 85) were assigned randomly to one of four treatment groups: 1) physical education with immediate reinforcement, 2) physical education with remote reinforcement 3) quiet and table games, and 4) control. Before and after the experimental period measures were obtained of IQ (1937 Stanford-Binet Form L), physical fitness (50-yard dash, sit-ups, pull-ups, and predicted AAHPER Youth Fitness Test total score), grip strength (dynamometer), level of aspiration (Clarke and Stratton technique), locus of evaluation and control (CLOE C Scale), and self-concept (Piers-Harris Self-Concept Scale). Follow-up information was collected six-weeks after the experiment ended to determine the stability of significant gains shown at the end of the eight week experimental period. Posttest and follow-up data analyses indicated: 1) levels of physical fitness performances were improved significantly, 2) immediate reinforcement resulted in greater improvement than remote reinforcement, 3) signficant gains demonstrated at the end of the experimental period remained significant over a six-week post experiment follow-up period, 4) a Hawthorne effect did not manifest itself over the eight-week period, and 5) results did not support the role of physical education in contributing to significant IQ improvement.

336. SOMMERS, Paul Allen. *An Assessment of Kinesio-Perceptual Abilities of the Mentally Retarded.* Master's thesis. Carbondale, Illinois: Southern Illinois University, 1969.

Male and female subjects (N=120; CA 8 to 24; IQ 30 to 80), classified by state definitions as mentally retarded but without severe neuromuscular or emotional problems, were selected at random from residents at a state school for mentally retarded persons and were given the Holt-Joiner Kinesio-Perceptual Test Battery. Prediction of IQ and mental retardation classification according to test items were computed. It was found that 67 percent of the variance in the criterion of IQ was accounted for by test items and was highly significant; prediction of mental retardation classification was not significant. It was also found that the more intelligent the subject the greater level of positive correlation with kinesio-perceptual items of the test.

337. SPITZ, Herman H. and Ronald Lipman. "A Comparison of Mental Retardation and Normals on Kinesthetic Figural Aftereffects." Journal of Abnormal and Social Psychology 62: 3: 686-687; May 1961.

This study compared kinesthetic figural aftereffects between mentally retarded (male N=35, CA $\bar{X}$ 19.3, IQ $\bar{X}$ 70.3; female N=20, CA $\bar{X}$ 18.8, IQ $\bar{X}$ 70.9) and normal (male N=32, CA $\bar{X}$ 20.3; female N=50, CA $\bar{X}$ 19.6) subjects. Goggles to block the lower half of vision were used during feedback practice trials for normal subjects and after feedback practice trials for retarded subjects; both groups used goggles during the experiment itself. Results indicated: 1) females of both groups had lower scores than males, 2) mean scores of normal subjects were significantly higher than those of retarded subjects, and 3) figural aftereffects tests of retarded subjects were more like those of brain damaged subjects and characterized by weaker processes than those of normal subjects of comparable chronological ages.

338. STEFANELLI, John R. "Physical Education for the Educable Mentally Retarded." The Digest of Mentally Retarded 2: 2: 86-88; Winter, 1965-66.

This report presents a discussion of values and benefits of instruction in physical activities and motor skills for mentally retarded boys and girls (CA 9 to 11). Classes in motor skills and participation in physical education were found necessary to develop dexterity needed for vocational adjustments; a progression of skills instruction was a necessity for improved muscular coordination and eye-hand coordination.

339. STEIN, Julian U. "Current Status of Research on Physical Activity for the Retarded." Expanding Concepts in Mental Retardation (George A. Jervis, Editor). Springfield, Illinois: Charles Thomas Publisher, 1968

This presents a review of the status of research in physical activity for mentally retarded persons by citing 13 tendencies which were prevalent at the time the article was written. Trends included eight statements examined in "What Research Says About Psychomotor Function of the Retarded" (see Stein and Pangle, study 345). Additional statements not found in the above article include: 1) kinesthetic receptors appeared relatively unimpaired in educable mentally retarded children who performed better on tests which required less integration of stimuli from both vestibulor and kinesthetic sensory media than on balance tests where greater integration of stimuli from both vestibulor and kinesthetic senses was needed for success; 2) when given the opportunity, educable mentally retarded persons learned certain motor skills as well as their peers, provided they performed an act often enough for it to become neurologically grooved; 3) motivation was an important factor to successful performance as progress, achievement, and fun had been shown to be indispensible ingredients in programs for retarded participants; 4) specific contributions of regular participation in physical activity programs to other aspects of education and development of mentally retarded persons had been reported--i.e., physical activities had served as a basis for art projects, English assignments, oral expression, safety lessons, and arithmetic manipulations; self-concept had increased; greater vocational productivity had resulted; and a variety of speech impairments had improved in the stress-free, non-competitive, and accepting environment of activity programs; and 5) studies dealing with trainable mentally retarded subjects showed gains in strength, endurance, adjustment, and socialization after participation in regular, systematic, and progressive programs of physical activity.

340. STEIN, Julian U. *Effects of Participating in a Four-Week Day Camp Program Upon Selected Measures of Physical Fitness in the Mentally Retarded.* Washington, D.C.: Joseph P. Kennedy Jr. Foundation, 1968.

This study investigated effects of participation in a four-week day camp program on selected measures of physical fitness of mentally retarded boys and girls. Thirty subjects (campers N=15, CA X 10.3, IQ X 62.5; noncampers N=15, CA X 10.0, IQ X 58.7) were given Hayden's Physical Fitness test for the Mentally Retarded during the four days immediately prior to opening of camp; the test was readministered during the four days

immediately after the close of camp. Findings showed: 1) campers improved on seven of eight items in both raw and standard scores, 2) noncampers also improved on seven of eight items in both raw and standard scores, 3) campers surpassed noncampers in five items when changes in standard scores were considered and made a significant change upward when standard scores were grouped into one of seven levels for classification, 4) improvements for noncampers were not significant when standard scores were grouped into one of the seven levels for classification, and 5) campers had more scores in very good and average categories than noncampers when standard scores from all posttest items were grouped into one of the seven classifications reflecting levels of performance. While data reflected only trends, overall gains made by campers on selected measures of physical fitness appeared to surpass those made by noncampers. Although these gains may have been caused and/or influenced by a combination of other factors, participation in the day camp program was felt to contribute to this progress.

341. STEIN, Julian U. "Motor Function and Physical Fitness of the Mentally Retarded: A Critical Review." Rehabilitation Literature 24: 8: 230-242, 263; August 1963.

This comprehensive review and critical analysis of research about motor proficiency, physical fitness, and motor ability of mentally retarded persons deals in depth with 1) the importance of motor function, 2) motor ability, 3) motor ability test batteries, 4) performance in complex versus simple skills, 5) physical fitness, 6) Oseretsky Tests of Motor Development, 7) rail walking tests, 8) reaction time, 9) manipulative dexterity, 10) growth and development, 11) peer relationships, 12) program objectives and status, and 13) thoughts for the future. Because of expanding interest, greater emphasis and continued growth of programs and activities for mentally retarded persons, educators were challenged to recognize the important values and benefits of active participation in physical education to help them in their total growth and development. Need for further research was cited and personnel involved in programs for retarded persons urged to explore fully the potential of movement, games, sports, rhythms, and other physical activities to 1) develop a better understanding and theoretical base for explaining behavior of mentally retarded persons, 2) gather useful information concerning growth, development, and learning of mentally retarded persons, and 3) develop sounder, more efficient, effective, and practical techniques for management and education of mentally retarded persons. Throughout this review emphasis was given lack of concern and understanding of problems encountered when persons work with retarded children in physical education programs and activities. Attention was also given indiscriminate placement of mentally retarded children in physical education classes which disregarded such factors as their inability to play naturally

and spontaneously and ignored findings of research dealing with physical and motor abilities, physical fitness, and motor proficiency of retarded and nonretarded persons alike. Well planned, carefully controlled, and scientifically executed experimental research was encouraged to shed light on questions and problems posed. Specific areas of needed research included investigations of 1) relationships of mental age, chronological age, and developmental factors with various components of physical fitness and motor proficiency, 2) effects of different types of program placement, specific activities, time allotments, and various methods and techniques, 3) separate populations of boys and girls in all possible situations--regular school classes, special classes in regular schools, special day classes, and residential schools at all levels--preschool, elementary, secondary, and postschool, and with subjects having all degrees of retardation--mild, moderate, severe and profound. Results of such studies should provide philosophical concepts and practical techniques to enable personnel working with mentally retarded persons to plan, develop, organize, and administer programs to meet the unique needs, abilities, and limitations of the many diversified groups of this population.

342. STEIN, Julian U. "Physical Fitness of Mentally Retarded Boys Relative to National Age Norms." Rehabilitation Literature 26: 7: 205-208; July 1965.

This project repeated a study by Brace (study 398) with the subjects consisting of public school (seventh and eighth grade) mentally retarded boys (N=24; CA 13-3 to 16-9; IQ 59 to 75) who participated one period a day for one school year in a public school physical education program. The AAHPER Youth Fitness Test was administered in October and May as part of the regular physical education program in which these mentally retarded boys participated. Results were compared with those in the Brace Study, and in each instance boys in this program performed significantly better while Brace's subjects scored significantly below national age norms, these retarded subjects did not differ significantly from nonretarded boys on whom individual test items had been normed. Discussion focuses upon factors causing these results to be in direct conflict with the earlier study.

343. STEIN, Julian U. *Physical Fitness In Relation to Intelligence Quotient, Social Distance, and Physique of Intermediate School Mentally Retarded Boys.* Doctoral dissertation. Nashville, Tennessee: George Peabody College, 1966.

Data collected from 187 boys who participated one period a day for one school year in one of six regular physical

education classes at the intermediate school level (seventh and eighth grades) revealed: 1) on the basis of raw scores, these intermediate school mentally retarded boys (N=24; CA $\bar{X}$ 14-10; IQ $\bar{X}$ 68.7) did as well as their nonretarded classmates (N=163; CA X 13-3; IQ $\bar{X}$ 107.7) on the AAHPER Youth Fitness Test except in the shuttle run and 600-yard run-walk, 2) when raw scores of the Youth Fitness Test were equated on the basis of age norms, retarded subjects did not do nearly as well as their classmates, 3) actual progress in the seven items of the Youth Fitness Test of these retarded boys (IQ 50 to 75) paralleled that of subjects in four other IQ groups (76 to 90; 91 to 110; 111 to 130; 131 and Up), 4) only retarded boys had losses in social status (Cowell Personal Distance Score) that differed significantly from losses experienced by subjects in the other IQ groups, 5) no positive relationships between IQ and changes in specific components of physical fitness of these mentally retarded boys, 6) no positive relationships between changes in social distance and changes in specific components of physical fitness of these mentally retarded boys, and 7) no positive relationships between physique (Wetzel Grid) and changes in specific components of physical fitness or in social distance of these mentally retarded boys. Evidence was not sufficient to justify conclusions concerning relationships between changes in specific components of physical fitness and quality of the physical education program in which these boys participated.

344. STEIN, Julian U. "Professional Preparation in Physical Education and Recreation for the Mentally Retarded." Education and Training of the Mentally Retarded, October 1969. pp. 101-108.

Personal and professional qualifications for personnel engaged in physical education and recreation programs for mentally retarded populations are presented. Information was based on a survey of 63 physical education and recreation personnel, each of whom had three to 15 years teaching experience. Results of this survey suggested that preparation at the undergraduate level should focus upon the general area of concern with sufficient exposure to handicapped and mentally retarded persons to handle most situations which arise; specialization should follow acquisition of this basic foundation. Considerations were offered for adjusting present physical education and recreation professional preparation programs to meet these specific needs.

345. STEIN, Julian U. and Roy V. Pangle. "What Research Says About Psychomotor Function of the Retarded." Journal of Health, Physical Education, and Recreation 34: 4: 36-38; April 1966.

This review provides information about physical proficiency, motor ability, and psychomotor function of mentally retarded

persons, and presents 13 research considerations for the time the article was written. Eight guidelines based on scientific knowledge include: 1) for a given age, and sex, normal children were superior to mentally retarded youngsters on most measures of motor proficiency, 2) in spite of underachievement with respect to motor function, mentally retarded children were much closer to the norm physically than mentally, 3) physical proficiency was improved in retarded children as a result of planned and systematic programs of physical education, 4) real differences existed between institutionized retarded persons and those enrolled in public school special classes, 5) mentally retarded children achieved better in activities characterized by simple rather than complex neuromuscular skills, 6) achievement in the area of physical fitness development apparently did not result in corresponding differential gains with regard to sociometric status of retarded youngsters, 7) significant IQ gains were achieved by educable mentally retarded boys participating in programs of planned and progressive physical education activities, and 8) motor proficiency and intelligence were more highly correlated in retarded than normal children.

346. STENDER, Annette M. *A Proposed Program of Physical Education for the Educable Mentally Retarded Enrolled in the Special Classroom of the Easthampton Junior High School.* Master's thesis. Northampton, Massachusetts: Smith College, 1968.

Discussions of causes and degrees of mental retardation, characteristics of educable mentally retarded persons, and program considerations and procedures precede actual presentation of this proposed physical education program for educable mentally retarded junior high school students. Program materials are presented by classification of activity types along with teaching hints and evaluative procedures.

347. STILLWELL, Frances M. *A Study of Locomotor Skill Retention of Mentally Retarded Individuals.* Master's thesis. Macomb, Illinois: Western Illinois University, August 1972.

This study was designed to compare retention of locomotor skills of randomly selected institutionalized mentally retarded subjects who participated in related activities (N=17, male 6, female 11; CA 18 to 44; MA 2 to 12; IQ severe to 58) with those who participated in unrelated activities (N=16, male 8, female 8; CA 19 to 44; MA 1.5 to 14; IQ severe to 67). Subjects had previously been designated as possessing capacity to learn motor skills based on results of Stanford-Binet and Weschler Adult Intelligence Scale

scores and from staff consultations. A modified version of the Temple University Motor Proficiency Battery for mentally retarded and emotionally handicapped children was used to evaluate on a pass-fail basis five fundamental motor skills: walk, hop left and right, jump, and run. After the pretest was administered, all subjects met five days a week to participate in 20 minutes of activity in which the five locomotor skills were taught and reinforced. At the end of two weeks subjects were divided by IQ into two groups and randomly assigned 1) a program in which subjects met only once during the week to take part in activities unrelated to previously thought locomotor skills, or 2) a program of activities in which subjects received daily emphasis on and opportunities to use previously taught locomotor skills. At the end of this week the Temple Test was readministered with comparisons showing: 1) no significant changes or differences in group retention at the end of the week of differential activities, and 2) the experimental group had gains not found in the control group through an overall decrease in percentage of failures in these locomotor skills.

348. STONER, Jan C. *The Effect of Two Levels of Pre-Task Exercise Upon The Performance of a Gross Motor Task by Educable Mentally Retarded Children.* Doctoral dissertation. Athens, Georgia: University of Georgia, 1972. See also, "The Effects of Two Levels of Pre-TasksExercise Upon the Performance of a Gross Motor Task by Educable Mentally Retarded Children." American Corrective Therapy Journal 27: 5: 141-144; September/October 1973.

Effects of different bicycle ergometer exercise bouts on subsequent performances of educable mentally retarded children on a stabilometer were investigated. Subjects (N=90; CA 12 to 18) were randomly assigned to one of three exercise groups: 1) rode at one-half maximum effort for two minutes at a rate of one revolution per second, 2) rode at one-fourth maximum effort for two minutes at a rate of one revolution per second, and 3) no pretask exercise. Immediately after the exercise bout each subject performed ten trials of 20 seconds duration on a stabilometer with intertrial rest periods of 20 seconds. On the second day of testing, no pretask exercise bouts were performed prior to five additional stabilometer trials which followed the same trial and rest patterns as on the first day. Analyses indicated: 1) no differences among groups for scores on stabilometer performances for either first or second days, 2) learning curves for all groups were linear with significant improvement between initial and final performance trails, 3) significant interaction for group scores on trials one to ten, and 4) no interaction on trials 11 to 15. Based on this evidence it was concluded that activities performed on the

first day of trials did not significantly affect learning; it was felt that exercise bouts were not demanding enough to affect either performance or learning.

349. STEVENSON, H. W. "Learning of Complex Problems by Normal and Retarded Subjects." American Journal of Mental Deficiency 64: 1021-1026; 1960.

Two groups of subjects--17 mentally retarded individuals ($\overline{CA}$ 15-8; MA 7-3) and 17 normal kindergarten children ($\overline{CA}$ 6-9; MA 5-4)--participated in two experiments dealing with object and pattern discrimination. These experiments resulted in no significant differences between retarded and normal subjects of comparable mental ages for object or pattern discrimination. Use of mental age, regardless of whether for normal or retarded children, as a rough index of learning ability seemed to be substantiated by this study.

350. STEWART, Joan E. *Participation of Mentally Retarded Children in a Swimming Program.* Master's thesis. Lincoln, Nebraska: University of Nebraska, January 1966.

Purposes of this study were to 1) evaluate a swimming program for trainable mentally retarded children (N=15, male 9, female 6; CA 7 to 16; IQ 34 to 55), 2) determine progress each child made in specific swimming skills, and 3) note changes in general behavior of participants. During the 12-week program, each child participated in three 35-minute classes per week. A case study method involving anectotal records and observation was used to report progress along with results from the Hiskey, Bossher, and McDonald Personal and Social Adjustment Inventory and the Hiskey Social Skills Check List; swimming progress was evaluated with objective check lists. Conclusions drawn from the study included: 1) case study method was useful in studying skill attainment of trainable mentally retarded children, 2) a one-to-one ratio was important for safety reasons and to facilitate learning of trainable retarded youngsters who participated in this swimming program, 3) trainable retarded boys and girls enjoyed learning to swim as a recreational activity in which they could participate with friends and families, 4) trainable youngsters devised ways to avoid as well as to facilitate learning, 5) in some cases conditioning was needed to help certain youngsters overcome fear, 6) with some children it was necessary to discover ways to acquaint them with water or with unpleasant tasks, 7) some youngsters had increased attention spans as success and motivation stimulated their interest, 8) a team approach was helpful, especially for

college students interested in working with retarded children, 9) trainable children learned best from demonstration and imitation, 10) preparation for the swimming class motivated students to develop self-care skills, and 11) youngsters showed more interest in expressing their independence as they participated longer in the program.

351. SUBOTNIK, L. and R. J. Callahan. "A Pilot Study in Short-Term Play Therapy with Institutionalized Educable Mentally Retarded Boys." American Journal of Mental Deficiency 63: 730-735; January 1959.

This study was designed to determine whether play therapy was helpful for educable mentally retarded boys (N=8; CA 8 to 12; IQ 53 to 88) who had emotional problems severe enough to interfere with their constructive participation in programs and activities at county training school for mentally retarded persons; brain damaged children and those who had previously received play therapy were excluded. A control period rather than a control group was used for comparative purposes as evaluative tests were administered four times: 1) at the beginning of an eight week control period, 2) at the beginning of an eight week play therapy period, 3) at the end of this therapy period, and 4) after an eight week follow-up period. Evaluative instruments included: Children's Anxiety Pictures, Auditory Memory Span for Digits, Ratio of Digit Span to WISC Vocabulary, Bender-Gestalt Test, and Draw a Person Test; behavior ratings were obtained from a cottage parent and two teachers. No significant differences were obtained for any of the evaluative instruments or among any of the different time periods. Data indicated that there were some methodological problems inherent in evaluating psychotherapeutic techniques.

352. SULLIVAN, James V. *The Development and Evaluation of a Teacher Preparation Course in Physical Education for Teachers of Educable Mentally Retarded Children.* Doctoral dissertation. Boston, Massachusetts: Boston University, 1971.

Educable mentally retarded children (N=[illegible]3; CA 8 to 15) were taught physical education for one year by 16 special education teachers who were divided into four groups according to their preparation to teach physical education to educable mentally retarded children. Pre and post assessments were made of motor ability, physical fitness, and social adjustment of these retarded children. Educable mentally retarded children taught by teachers who had taken a special physical education course showed significantly more improvement than children in the other three groups. Performances of children in this group indicated that teachers learned methods, techniques, and skills from taking a special physical education course dealing with educable mentally retarded children.

353. TAYLOR, George R. *The Relationship Between Varying Amounts of Physical Education Upon the Development of Certain Motor Skills in Trainable Mentally Retarded Children.* Doctoral dissertation. Washington, D.C.: Catholic University of America, 1969.

This investigation dealt with the impact of participation in an organized physical education program on levels of minimum muscular fitness (Kraus-Weber Test), social behavior (checklist devised by the investigator using the Cain-Levine Social Competency Scale as a guide), and academic achievement (Trainable Mentally Retarded Profile) of public school trainable mentally retarded boys (CA 10 to 16; IQ 30 to 50). The experimental group (N=35) participated in a structured physical education program three days a week for six months while the control group (N=35) remained in the classroom and participated in usual classroom activities. Analyses of results suggested that boys in the experimental group gained appreciably in levels of minimum muscular fitness from their participation in organized physical education activities.

354. TAYLOR, Z. Ann. *The Development of a Core Curriculum in Health and Safety Education for Trainable Mentally Retarded Children.* Master's thesis. Denton, Texas: Texas Woman's University, 1966.

This study describes a ten week program covering personal and community health and safety developed for and presented to nine trainable mentally retarded boys and girls at a special school for mentally retarded. Subjects were provided with experiences in arts and crafts, music, language development, and physical education to develop appropriate understandings, attitudes, and practices. Case studies indicated that children made observable progress toward achieving self-realization, developing desirable human relations, attaining economic efficiency, and assuming civic responsibility.

355. THOMPSON, Morton. "National Survey of Community Recreation Services to the Mentally Retarded and Physically Handicapped. Recreation, April 1965. pp. 191-192.

This presents a summary of a 1964 survey of 2,000 community recreation departments to determine services provided in community settings for mentally retarded and physically handicapped persons. A total of 42 communities indicated that some recreation programs and/or facilities were available for either or both of these groups. However, only 202 (47.3 percent) responses were received from the 427 communities in answer to the final questionnaire. Analyses of these data indicated that mentally retarded and physically handicapped persons

were offered almost identical opportunities as nonhandicapped persons in about half of the responding communities; likes and dislikes of mentally retarded and physically handicapped persons were very similar to those of nonhandicapped persons. Sections of this summary deal with activities, facilities, program organization and administration, transportation, financial support, and supervision of programs and activities.

356. THURSTONE, Thelma G. *An Evaluation of Educating Mentally Handicapped Children in Special Classes and in Regular Classes.* Chapel Hill, North Carolina: University of North Carolina. (U.S. Office of Education Cooperative Research Program, Project No. 168, OE-SAE-6452) January 16, 1961.

This study compared ability of educable mentally handicapped children (N=559, boys 347, girls 212; CA 7 to 15; IQ 50 to 79) to perform selected gross motor skills with performances of normal children (N=1825, boys 1604, girls 1221) of the same sex and chronological age; comparisons of instruction in regular and special public school classes were also made. Results indicated: 1) mentally handicapped children received fewer opportunities than normal children in school, 2) these mentally handicapped children tended to be socially isolated in regular classrooms but socially integrated in special classes, 3) gross motor skills of normal children were consistently superior to those of mentally handicapped children, 4) increased chronological age was accompanied by improvement in achievement and motor skills, 5) differences between boys and girls were often significant but not between negroid and caucasian children, 6) differences in performances were significant among subjects functioning at three intelligence levels IQ 50 to 59, 60 to 69, and 70 to 79, 7) arithmetic computation was the one area in which these mentally handicapped children most nearly approximated their predicted score, suggesting they performed better using rote memory material than when required to reason, 8) spelling patterns were similar to arithmetic results, and 9) mentally handicapped children consistently did better work in regular classes than in special ones.

357. TIZARD, J. and F. M. Loos. "The Learning of Spatial Relations Tests by Adult Imbeciles." American Journal of Mental Deficiency 59: 85-90; 1954.

The Minnesota Spatial Relations Test was administered to eight institutionalized male adult medium-grade imbeciles (IQ 24 to 42, $\bar{X}$ 34.1; CA 19 to 29, $\bar{X}$ 20.4); subjects who could not complete the test were given special training and retested. All subjects were tested again one month later. Results indicated: 1) after training all subjects showed rapid improvement and considerable transfer

of learning from training to testing situations, 2) scores on the test given a month later were much higher than initial scores, and 3) initial scores were not good indications of subjects' performances after practice.

358. TOFTE, D. F. "Initiating and Developing a Recreation Program for Institutional Defectives." American Journal of Mental Deficiency 55: 341-344; January 1951.

This report describes a recreation program established at the Southern Wisconsin Colony and Training School; emphasis was on active participation rather than passive spectator activities. Types of activities included camping, swimming, baseball, ping pong, cards, table games, puzzles, ice skating, roller skating, and homemade games such as ring toss and bean bag boards; camping and swimming were amont the most successful experiences. When working with youngsters between the ages of seven and 14, five children were all that could be effectively supervised and helped at one time; adult leadership was needed for younger children. These procedures and the program raised morale of residents and reduced serious behavior problems which stemmed primarily from inactivity. Recommendations included need to 1) use recreationally-oriented personnel, 2) provide adequate financial support, and 3) develop evaluative criteria and techniques for the described recreation program.

359. TURNQUIST, Donald Arthur. *A Study of Physical Education Needs for Mentally Retarded Pupils in Illinois Public Schools.* Master's thesis. Normal, Illinois: Illinois State University, 1952. See, "Motor Abilities of Mentally Retarded Youth" by Donald A. Turnquist and S. S. Marzolf in Journal of Health, Physical Education, Recreation 25: 3: 43-44; March 1954.

Motor abilities (Lincoln Adaptation of the Oseretsky Test of Motor Development) of a group of mentally retarded children (N=11, boys 6, girls 5; CA $\bar{X}$ 13-6; IQ 55 to 83, $\bar{X}$ 69) were compared with those of a control group consisting of children with average intelligence (N=11, boys 6, girls 5; CA $\bar{X}$ 13-6; IQ 93 to 113, $\bar{X}$ 102). Results showed: 1) control group scored higher on 40 (20 significant) of 65 test items, 2) mentally retarded subjects had higher scores on 14 items (5 significant), 3) no differences on 11 items with most subjects in both groups passing or failing these individual test items, 4) major differences between groups on items categorized as synkinesia, simultaneous movement, and general static coordination, 5) least differences between groups in dynamic manual coordination, general dynamic coordination, and speed items. It was felt generally that 1) these mentally

retarded subjects exhibited some significant weaknesses in motor proficiency, and 2) special physical education programs and adjustments in existing programs were needed to meet motor needs and physical capabilities of mentally retarded boys and girls.

Prior to conducting this experimental study the researcher sent letters of inquiry about specific aspects of physical education programs to personnel in 28 cities throughout the United States; 12 letters were directed to persons in cities in Illinois. Analyses and discussion were based on 20 replies (71 percent)--nine (75 percent) from Illinois and 11 (69 percent) from other parts of the country. Information was obtained about 1) facilities and equipment for teaching physical education to mentally retarded children, 2) personnel responsible for teaching these children in physical education, 3) programs and activities, and 4) pressing problems confronting personnel involved in these programs. Major trends included: 1) mentally retarded children had access to the same equipment and facilities as other children, 2) they enjoyed activities in the gymnasium and played most games with some modification, 3) regular physical education teachers had major responsibility for these programs, 4) most activities were those from a regular program and modified according to student needs, and 5) greatest problem was in obtaining assistance for modifying activities so they were appropriate for these children.

360. TWENTER, Valerie S. *The Effect of Selected Motor Activities on the Social Adjustment and Motor Educability of Educable Mentally Handicapped Children.* Master's thesis. Charleston, Illinois: Eastern Illinois University, 1967.

This study was designed to determine effects of selected physical education activities on development of social competencies and on two components of motor educability (balance and agility) of mentally handicapped children. An experimental group (N=8, boys 5, girls 3; CA 12-5 to 15-5, $\bar{X}$ 13-10; MA 5-6 to 10-1, $\bar{X}$ 8-5) received 30 minutes of physical education five days per week for eight weeks while the control group (N=8, boys 4, girls 4; CA 12-8 to 13-10, $\bar{X}$ 13-3; MA 5-3 to 10-2, $\bar{X}$ 7-8) did not participate in physical education activities. Test instruments included a modified version of the Penny Cup Test, Bass Test of Dynamic Balance, and Vineland Social Maturity Scale. The experimental group did significantly better than the control group on the Bass Test while no significant changes were noted between groups on the Penny Cup Test or on the Vineland Social Maturity Scale. The experimental group improved on all test items while performances of the control group were marked by regression on each item.

361. VALENTINER, Harriett L. "The Comparative Fatigability of Normal and Mentally Deficient Children." Journal of Abnormal Psychology 36: 60: 51-61; 1941.

The question as to whether mentally deficient children could profitably be kept at specific kinds of class activities as long as normal children when activities were planned to meet their levels of intelligence was studied. Subjects (N=17 pairs of boys, 9 pairs of girls; CA 10-3 to 13-4; IQ mentally deficient 50 to 76; normal 91 to 111) were tested two at a time under the same conditions on grip strength, recognition of numbers and letters of the alphabet, steadiness, color recognition, and ergographic performance. Results showed that mentally deficient children were somewhat inferior to normals in muscular strength (weaker hand grip) and somewhat less efficient in steadiness but were not markedly more susceptible to muscular fatigue resulting from continuous ergographic performance. In mental activities such as naming colors and recognizing numbers and letters, mentally deficient children performed at a somewhat lower level and with less accuracy than normal children. The amount and rate of onset of fatigue in such mental work was greater in the case of mentally deficient children as indicated by greater reduction in speed and accuracy and greater accumulation of mental blocks.

362. WADE, Michael G. "Biorhythms and Activity Levels in the Free-Play of Institutionalized Mentally Retarded Children." *Abstracts of Research Papers, 1972 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1972.

Interaction between arousal to action by environmental stimuli and recovery from that activity was presumed to generate biorhythms in activity levels of mentally retarded children. Five profoundly retarded children (male 2, female 3) played in groups of two or three in a specially constructed playroom 20 feet square that contained tubular steel play apparatus designed to elicit play behavior in young children. Free play activity of the children was monitored via heart rate telemetry system with each child wearing a small transmitter at waist level. Data were continuously recorded during play sessions wich lasted up to two hours each. Data were analyzed statistically and by spectral analysis to determine whether average activity level and biorhythms were susceptible to manipulation by variation of group size and sex; all groups consisted of children of the same sex. Analyses revealed: 1) no significant differences due to sex or play group size, 2) power spectra of play sessions produced a variety of biorhythms with no clear bandwidths indicated, 3) a white noise

test (Bohrer, 1970) indicated that meaningful frequencies existed at cycles faster than 24.5 minutes per cycle, and 4) biorhythm did not appear to show variance estimates as a function of sex or play group size.

363. WAGNER, Harry D. *The Effects of Motivation and Repeated Trials on Physical Proficiency Test Performance of Educable Mentally Retarded Girls.* Doctoral dissertation. Nashville, Tennessee: George Peabody College, August 1967.

Purpose of this study was to determine effects of selected motivating conditions on physical proficiency test performances of public school educable mentally retarded girls (N=9; CA 12 to 16; IQ 55 to 82; MA 5-9 to 9-2) and normal chronological (N=12; CA 13-4 to 14-2; IQ 97 to 121; MA 13 to 16-8) and mental (N=12; CA 7-9 to 8-9; IQ 96 to 114; MA 7-9 to 9-9) age peers. Attempts were also made to determine effects of repeated trials on these same physical proficiency measures and to compare patterns of performance of retarded girls over trials with those of normal chronological and mental age peers. Measures of 1) grip strength, 2) volleyball throw for distance, 3) standing broad jump, and 4) 30-yard dash were taken to represent various aspects of motor development. Each was presented under 1) standard instruction, 2) active encouragement, and 3) candy reward motivating conditions. Order of presentation of motivating conditions counterbalanced effects of practice on physical performance; subjects performed each of the test items in 18 trials.

General conclusions arising from the study were: 1) all three groups performed significantly better when active encouragement was added to standard instruction, 2) all three groups showed additional significant improvement when candy reward was added to active encouragement, 3) amount of performance improvement through increased motivation varied for mentally retarded, normal CA, and normal MA groups with most dramatic differences for retarded girls coming through addition of candy reward--it was at this motivational level that these girls performed most nearly at the level of their CA peers, 4) order in which motivating conditions were applied made some significant differences among retarded and normal MA girls--both groups showed greatest improvement when motivation levels were ordered from lowest to highest, 5) no group of subjects reached maximum performance on these physical proficiency measures before the third trial, 6) group of retarded girls did not reach maximum performance until middle and late trials of their 12 attempts, 7) on the 30-yard dash and the volleyball throw retarded girls did not reach maximum performance until the eleventh trial, eighth trial on group strength, and ninth trial on standing broad jump, 8) both normal groups reached maximum performance at about the

third trial and no later than the fifth trial on any proficiency measures, and 9) once maximum performance was attained, it was not sustained by any group.

Major differences between abilities of these mentally retarded girls and their normal chronological and mental age peers on measures of physical proficiency were noted. Performance of the CA group was significantly better than that of the group of retarded girls on all measures over trials except in grip strength where retarded girls surpassed performances of the CA's in the late trials. The EMR group scored significantly better than MA subjects on all measures over trials. There was also a general decline between CA and EMR subjects' performances over trails.

364. WAMBERG, Erik and Britta Holle. "Physical Training of Mentally Retarded Children." *Proceedings Copenhagen Conference on the Scientific Study of Mental Retardation, 1964 (Volume II).* Copenhagen, Denmark: Danish National Services for the Mentally Retarded, 1964.

Systematic training of muscular strength, coordination, equilibrium, quickness, and staying power of debilitated children was investigated. Muscle strength of 87 boys and girls (CA 12 to 18; IQ 47 to 85) was tested before and after a ten week training period. Findings showed an increase in the strength of major muscle groups in all cases. Through common play activities, a second group of 16 boys and girls (CA 9 to 13; IQ 50 to 80) was evaluated with respect to coordination, equilibrium, and quickness. These students were trained for 20 minutes, three times a week, for three months after which their equilibrium became more satisfactory, quickness increased, and coordination improved. Children in the third group (N=27; CA 12 to 16; IQ 55 to 85) were chosen because their staying power was least satisfactory. After participating in gymnastic training, outdoor games and exercises, including running and bicycling, twice weekly for two months, staying power of these boys and girls was gradually increased.

365. WEBB, Ruth C. "Sensori-Motor Training of the Profoundly Retarded." American Journal of Mental Deficiency 74: 2: 283-295; September 1969.

Severely and profoundly mentally retarded subjects (N=32, males 17, females 15; CA 2-6 to 17-6, $\bar{X}$ 9-11; social ages 2 to 21 months, $\bar{X}$ 8 months) were selected by ward personnel to participage in a special training program for an hour a day, four days a week; period of training varied from five and one-half to ten and one-half months. Efforts were made 1) to stimulate primary

senses (tactility, kinesthesia, vision, audition) and 2) to encourage their integration with each other as well as with motor responses needed to express behavior patterns implicit in sensory integration. Training techniques were designed to 1) increase level of awareness, 2) stimulate movement, 3) improve ability to manipulate the environment, and 4) develop posture and locomotion. Pre and posttest evaluations were made with a special rating scale (AMMP Index- awareness, movement, manipulation of the environment, posture and locomotion) to assess sensory-motor development in profoundly retarded persons; each subject was also evaluated with the Vineland Social Maturity Scale (VSMS). Measures of control tendencies indicated a slight group trend toward improvement on both AAMP and VSMS instruments; a correlation of .78 was obtained between the two measures. Clinical analyses of changes between pre and post treatment behavior tended to be more meaningful than statistical comparisons. A tentative theory underlying application of these sensory-motor techniques to profoundly retarded persons was presented as a point of departure for discussion and development of future theoretical foundations. Details about the sensory-motor training program and the complete AMMP Index are included in this source.

366. WEIGL, V. "Functional Music: A Therapeutic Tool in Working With the Mentally Retarded." American Journal of Mental Deficiency 63: 672-678; 1959.

The procedure and some results of functional music classes conducted at a hospital clinic for mentally retarded persons are discussed. Functional music is defined as music used not for any esthetic value, but for its effectiveness in reaching practical therapeutic goals outside of music itself. Participating groups contained all types of retarded children. Classes were conducted once a week for 45 minutes with activities including rhythm bands, games, experimentation with piano and autoharp, singing, and acting out songs. Progress reports were presented for each child at the end of each ten week term. Factors such as attitudes toward peers and adults, attention span, body control, rhythmic coordination, language, memory, imagination, and social adjustment were noted and compared with achievement prior to participation in the program. It was found that about ten percent did not change perceptibly, 20 percent showed improvement in class but had little transfer to activities out of class, and about 70 percent demonstrated positive changes particularly in emotional and social areas. The researcher felt that regular and more frequent music sessions would have been helpful.

367. WEINER, Bluma B. "Play and Recreation Activities of Young Mentally Retarded Boys in a Residential Pre-Academic Program." American Journal of Mental Deficiency 57: 594-600; 1953.

This article describes a play and recreation program conducted at Wayne County Training School, Northville, Michigan. The daily schedule is discussed, as well as content of the overall recreational program. A list of activities included during one year is discussed to demonstrate the wide range of possibilities available to recreation leaders. The article also contains a discussion and evaluation of this program.

368. WELLMEN, B. L. "Physical Growth and Motor Development and Their Relation to Mental Development in Children." A Handbook of Child Psychology (I.C. Murchison, Editor). Worchester, Massachusetts: Clark University Press, 1931. pp. 242-277.

This study offers a broad survey of research dealing with physical growth including such areas as motor development, physical achievement, and relationships among physical, mental, and motor development. The following findings appeared particularly relevant to mentally retarded persons: 1) several studies indicated that children who scored low in grade placement for their ages and whose class marks were also low seemed deficient physically, being shorter, lighter, and generally smaller and/or slower in development; other studies contradicted these findings and at least study one indicated that poor students were better developed physically. 2) A study that dealt with 125 junior high students showed that of those who were retarded one year, 60 percent were above physical development norms, of those who were retarded two years, 50 percent were above the norms, and of those who were retarded three or more years, two-thirds were below norms. 3) Further studies indicated that mentally defective persons were shorter and lighter than average and that imbeciles (profoundly retarded) and idiots (moderately retarded) were shorter and lighter than feebleminded (mildly retarded) individuals; mentally retarded children showed evidence of a retarded anatomical development according to a classification ratio; other studies reported no relationships between mental age and physical development. In general there was a slight positive correlation between mental and physical development, the degree related to conditions and combinations of traits being compared. Separation of mental and motor ability in young children was extremely difficult.

369. WELLS, John Charles. *Improving the Health Status of Blind Mentally Retarded Children Through Adapted Physical Education.* Doctoral dissertation. Bloomington, Indiana: Indiana University, September 1971.

This study was conducted to develop programs of individually prescribed adapted physical education activities to improve the health status of six blind and mentally retarded children (boys 3, girls 3; CA 9-3 to 13-1; IQ 12 to 60; MA 18 months to 6-0). Each of the six children received initial medical and manual muscle examinations. On the basis of health problems noted from these examinations and those found in each child's health history, individual and group physical education activities were prescribed for each child. Monthly visits were made to the homes of the children to talk with parents and to find by personal observation home conditions of each child. At the conclusion of the investigation each of the children received final medical and muscle examinations from the same individuals who conducted initial examinations. Final evaluations of the health status of subjects were based on improvements noted. Findings of the investigation showed: 1) health status of the six children improved, 2) amount of improvement was different in each of the six children, 3) an unexpected leadership ability evolved in three of the children which permitted them to conduct activity and calisthenic periods, and 4) special techniques for children who were both blind and mentally retarded had to be utilized when conducting physical education activities for them.

370. WENNERLIND, Donald C. *The Relationship of Physical Fitness Scores to Intelligence Scores of Mentally Retarded Boys.* Master's thesis. Seattle, Washington: University of Washington, 1966.

Purpose of this study was to determine relationships between physical fitness scores and intelligence quotients of mentally retarded boys. Subjects (N=248) were given the Washington State Physical Fitness Test and then divided on the basis of scores on the Wechsler Intelligence Test for Children into low (IQ 45 to 62) and high (IQ 63 to 80) groups. Analyses revealed: 1) groups differed significantly in strength and agility items and in total fitness, 2) correlation between fitness scores and IQ was .35, and 3) Negro boys had higher mean scores on all fitness test items than Caucasian boys and were significantly higher in pull-ups, dips, jump-reach, total strength, agility, and total fitness.

371. WHEELER, L. R. "A Comparative Study of the Physical Growth of Dull Children." Journal of Educational Research 2: 4: 273-282; November 1929.

Administrations of the Dearborn Group Intelligence Test (for six consecutive years) to a group of North European public school children

(N=273, boys 154, girls 119; CA 6 to 11; IQ 70 to 90) revealed positive relationships between physical measures--standing and sitting heights, weight, leg and trunk lengths, and sternal and illiac widths--and mental development. Results indicated that dull children were below normal in all measures of physical growth except in trunk length and illiac measurements for six year old girls.

372. WERNER, H. and B. D. Thuma. "A Deficiency in the Perception of Apparent Motion in Children with Brain Injury." American Journal of Psychology 55: 58-67; 1942.

Deficiency in the perception of apparent motion in children with brain injury was investigated. Subjects (CA 11 to 14) were divided into two groups of 20 each; each group consisted of subjects with comparable mental ages and intelligence quotients. The experimental group was composed of brain-injured children (MA 7-8 to 12-8, $\bar{X}$ 8-9; IQ 55 to 95, $\bar{X}$ 69) with no subjects having gross motor disturbances or visual agnosia. The control group (MA 8 to 11, $\bar{X}$ 9; IQ 58 to 90, $\bar{X}$ 72) was made-up of children diagnosed as endogenous-familial or hereditary type mentally retarded. It was found through four different experiments that brain-damaged children 1) perceived real motion but were unable to perceive apparent motion, 2) were slower to perceive simultaneity, 3) rarely saw motion with tachistoscopic exposure of single figures, and 4) were less influenced by one tachistoscopically exposed figure followed immediately by another. The researchers felt that these findings were affected by impairments of spacio-temporal organization.

373. WHITAKER, Johnette. *A Therapeutic Recreation Program in Relationship to Solitary Free Play Patterns of Institutionalized Mentally Retarded Male Children.* Master's thesis. University Park, Pennsylvania: Pennsylvania State University, 1972.

Two groups of ten boys each were selected from the same ward of a residential facility for mentally retarded persons. Group I took part in the ongoing therapeutic recreation program while Group 2 did not participate. Each individual was observed twice during a ten minute free-play session within a prepared environment with 16 selected toys. Fourteen descriptive categories were established for analyses of play activities: combination, imaginative, transportation, structural, manipulative, auditory, creative, inspection, noninteractive, repetitive, oral, random, destructive, and inactivity. It was concluded: 1) therapeutic recreation participants displayed more purposive free-play patterns in

their solitary play than nonparticipants, 2) more specific organization as well as more recognizable specialization in toy usage were obserable in free-play patterns of participants than nonparticipants, and 3) a closed play environment allowing only solitary free-play and with preselected toys randomly arranged was successfully used to reveal and recognize play patterns.

374. WHITE, Charles. *Acquisition of Lateral Balance Between Trainable Mentally Retarded Children and Kindergarten Children in an Individually Prescribed Instruction Program.* Master's thesis. Slippery Rock, Pennsylvania, Slippery Rock State College, 1971.

Rates of acquisition of skills in lateral balance activities of trainable mentally retarded (N=13; CA 12 to 16; IQ 35 to 50) and kindergarten (N=20; CA 4-6 to 6-7) children were compared. Subjects were matched on initial entry levels in programs designed to develop lateral balance; these programs were individually prescribed for each subject on the basis of his initial performance. Total instructional time consisted of 11 periods of three ten second bouts of activity in each of two programs--1) static lateral balance using balance stick activities, and 2) dynamic lateral balance using a balance beam. Activities were arranged in hierarchial order (order of difficulty) based on initial performances for both static and dynamic lateral balance; results were computed on the basis of the number of units completed after 11 periods of activity. Analyses revealed: 1) no significant differences in rate of learning between kindergarten and trainable mentally retarded subjects in these static lateral activities, and 2) a significant difference in rate of learning between kindergarten and trainable retarded subjects in favor of kindergarten pupils in this dynamic lateral balance program. The researcher concluded that task complexity influenced performances of retarded subjects when compared with those of normal children possessing the same basic abilities.

375. WHITE, Tommie L. and David K. Eler. *Study Comparing Muscular Fitness of the Mentally Retarded and Normal Children.* Special Research Project. Vermillion, South Dakota: University of South Dakota, May 24, 1967.

Mentally retarded children (N=12; CA 8 to 15; MA 4 to 11) were compared with two groups one matched on the basis of chronological age and the other on the basis of mental age of 12 normal children on straight arm bar hang, speed back lifts, speed sit-ups, and vertical jump. The normal chronological age comparison group performed significantly better than mentally retarded children on speed back lifts and vertical jump while, retarded youngsters performed significantly better than the mental age comparison

group on the bar hang and speed sit-ups. No significant differences were found in other comparisons--i.e., bar hang and speed sit-ups between mentally retarded and chronological age comparison groups and speed back lifts and vertical jump between mentally retarded and mental age comparison groups.

376. WIDDOP, James H. *The Motor Performance of Educable Mentally Retarded Children with Particular Reference to the Identification of Factors Associated with Individual Differences in Performance.* Doctoral dissertation. Madison, Wisconsin: University of Wisconsin, 1967.

This study describes a project in which 4,406 mentally retarded (IQ 50 to 75) boys and girls reasonably equally distributed by age (CA 8 to 18) and sex, throughout the United States were given a modified version of the AAHPER Youth Fitness Test; homeroom teachers completed a Cowell behavior trend for each child; questionnaires regarding home background were sent to parents of children tested. Results indicated: 1) retarded boys and girls at all age levels were substantially below mean performance levels of children of normal intelligence on all test items, 2) when classified by age/weight/height, differences between performances of normal and educable mentally retarded children were virtually the same as when comparisons were made on the basis of age only, 3) sex differences in performance of educable mentally retarded children were similar to those noted in normal children, and 4) family backgrounds and early childhood experiences were related to performance levels of these children.

377. WILLIAMS, Clarence Freeman. *A Study to Determine the Relationship Between Physical Fitness and Intelligence Among Mentally Retarded Persons.* Master's thesis. Durham, North Carolina: North Carolina College, 1964.

This study sought to determine relationships between physical fitness and intelligence among mentally retarded boys and girls. Subjects (CA 11 to 17) included both educable (N=132, boys 75, girls 52; IQ 50 to 75) and trainable (N=147, boys 72, girls 75; IQ 30 to 49) youngsters. Physical fitness was assessed by the North Carolina Fitness Test which measures abdominal strength and endurance (30-second sit-ups), agility and speed (side stepping test and 30-second squat thrusts), power (standing broad jump), and arm and shoulder strength and endurance (30-second pull-ups for boys and modified pull-ups for girls). A wider difference was noted on correlation coefficients between physical fitness and intelligence of educable (r=.77) and trainable boys (r=.70) than between educable(r=.68) and

trainable (r=.71) girls; in general a positive relationship was noted between physical fitness and intelligence among all groups. Among problems encountered in administering the fitness test were: 1) many subjects had difficulty learning to perform test items properly, 2) some subjects had difficulty understanding the significance of doing their best, 3) other subjects failed to sense the importance of time limits on four test items, 4) some trainable youngsters took as long as three and one-half months to understand and take the test, and 5) many subjects had difficulty in following directions and understanding instructions.

378. WILSECK, Robert F. *The Effects of a Patterning Program of Physical Activity on the Motor Ability Performance of the Educable Mentally Retarded.* Doctoral dissertation. Greeley, Colorado: Colorado State College (University of Northern Colorado), 1968.

This study was designed to determine effects of a patterning program of physical activity upon the motor ability of educable mentally retarded children. An experimental group (N=30; IQ $\bar{X}$ 64.2; CA $\bar{X}$ 8-1) participated in 30 minutes of special motor patterning activities five days a week from September through May; these activities emphasized movement patterns rather than skills and were conducted in areas such as gross motor, body image, bilateral, cross pattern, and spatial orientation. A control group (N=30; IQ $\bar{X}$ 66.5; CA $\bar{X}$ 8-1) participated for 30 minutes a day, five days a week from September through May in a standard physical education program consisting of instruction in basic skills, individual and mass activities, stunts and tumbling, and rhythms. The Lincoln-Oseretsky Motor Development Test was administered in September to match groups, in January at the mid-point of the study, and in May at its conclusion. Results were analyzed in terms of 1) development of motor ability, 2) IQ on learning motor skills, and 3) program effects over the experimental period. It was found that neither program was more effective in developing motor ability and skills of educable mentally retarded children--a well structured program of regular physical education activities proved to be as beneficial as the special motor patterning program.

379. WINDELL, Edith Jane. *Evaluation of Gait Patterns of Trainable Mentally Retarded Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1971.

Electromyographic examinations of selected muscles and simultaneous measurements of time relations between stance and swing phases of the lower extremity were made. Characteristically shaped deflections recorded from the walking force transducer were analyzed quantitatively to establish a pattern for the time relationship of the foot during various walking phases.

Duration of electrical activity for each of three muscles was analyzed quantitatively during stance and swing phases as well as duration of electrical activity for the total gait cycle. Ten consecutive steps were analyzed for each subject and the mean percent was computed for comparison of gaits from the following groups: 1) normal and trainable mentally retarded children, 2) normal and trainable mentally retarded boys, 3) normal and trainable mentally retarded girls, 4) sex within trainable mentally retarded children, 5) chronological age within trainable mentally retarded children, and 6) chronological age for normal and trainable mentally retarded children. Results indicated: 1) trainable mentally retarded children showed a gait pattern that was consistently different from that of normal subjects, 2) age was an influencing factor with younger trainable mentally retarded children, and 3) sex did not influence gait pattern of trainable mentally retarded boys and girls.

380. WOLF, Valerie. *The Effects of Part Versus Whole Learning of a Motor Skill with Educable Retarded Children.* Master's thesis. Ithaca, New York: Ithaca College, 1971.

Purpose of this study was to compare effects of part versus whole learning of a motor skill with mentally retarded children (N=40, males 22, females 18; CA 8 to 11-11). The two experimental groups were 1) part group which learned a novel ball-rolling task in three parts, and 2) whole group which learned the task as a whole unit. Subjects were matched according to scores obtained on a preliminary ball-accuracy taks and according to sex. Analyses yielded no significant differences due to method on any of the dependent measures. However, males learned the ball-rolling task in significantly less time, with significantly fewer trials, and with significantly fewer errors than females. Significant method--sex interactions were found for verbal instruction time and for speed errors. Further analyses revealed: 1) females in the part group learned the ball-rolling task with significantly more speed errors than females in the whole group or males in the part group, and 2) no significant differences were found between whole group males and whole group females or between whole group males and part group males.

381. WONDERGEM, Ray. *A Study of Physical Education Participation and Physical Fitness Development in Trainable and Educable Mentally Retarded Children.* Master's thesis. La Crosse, Wisconsin: Wisconsin State University, 1972.

This study was designed to evaluate frequency of participation in physical education activities on muscle

and organic fitness levels of trainable and educable mentally retarded children. Subproblems included investigations of 1) physical education programs taught by certified physical educators and/or student teachers, 2) integrated physical education programs, and 3) a special education school population with no formal physical education instruction. Subjects were pre- and posttested (27 weeks apart) with a Physical Fitness Test Battery for the mentally retarded. No differences were found in any group in levels of muscle or organic fitness.

382. WOODWARD, Mary and Diana J. Stern. "Developmental Patterns of Severely Subnormal Children." British Journal of Educational Psychology 33: 1: 10-21; February 1963.

This study was designed to 1) determine locomotor, language, and social development of children classified according to Piaget's six sensory-motor ages, and 2) examine patterns of development in young severely subnormal children (N=83; CA 11 months to 8-7). Children were tested in performance ability, locomotor development, speech development, verbal comprehension, and feeding skills. Results indicated that severely retarded children tended to develop much more rapidly in locomotor areas than in speech which supported the hypothesis that severely subnormal children develop more rapidly in areas associated with maturation than in those requiring learning. Support was also given to the concept that permanence of objects was necessary for acquisition of meaningful speech; once children learned this concept, they benefited from programs and activities of a training center. Associated with Piaget's last sensori-motor stage were certain developments in language, drawing, performance ability, and social responses suggesting that achievement at the end of the sensori-motor period was an important step in the development of severely subnormal children.

383. WRIGHT, Alexander. *A Study to Determine the Effects of Physical Education on Educable Mentally Retarded Children's Motor Ability and Motor Fitness.* Master's thesis. Springfield, Massachusetts: Springfield College, August 1968.

This study was designed to determine whether levels of motor fitness and motor of mentally retarded children were static and prevented them from participating in physical activities and from scoring as well as nonretarded children in physical performance tests. Mentally retarded (N=33; CA 8-6 to 10-6; IQ 55 to 79) boys and girls were divided into experimental (girls 6, boys 12) and control (girls 5, boys 10) groups. A short form motor fitness battery included standing broad jump, push-ups, forward trunk flexion, AAHPER shuttle run, and squat

thrusts; motor ability was measured by the Brace Scale. The experimental group participated in three 30-minute adapted physical education sessions a week for six weeks. Each of these physical education periods included introductory activities, basic body movements, class and group activities such as apparatus work, games, and relays. The experimental group improved significantly in both motor fitness and motor ability while the control group did not show such progress. The researcher concluded that since motor performance of educable mentally retarded children could be improved, nonparticipation and apathy towards participation were due to factors other than poor motor fitness and poor motor ability. Implications for curriculum development were briefly discussed.

384. WYRICK, Waneen. "Straight Line Copying Ability of Mentally Retarded Males." *Abstracts of Research Papers, 1971 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1971.

Purposes of this study were to determine 1) ability of educable mental retarded males to trace, with and without visual cues, a straight line in the sagittal plane of the body from the midline and from a point laterally displaced but parallel to the midline of the body, 2) effects of visual cues upon drawing performances, 3) effects of practice under one visual or nonvisual condition on performance of the other, and 4) variability and relationship of performances on both tasks under visual and nonvisual cues. Sixteen educable mentally retarded adult males completed eight trials of two copying tasks under varying conditions of visual feedback and in order of feedback; each subject completed four trials, two with vision and two without vision, for each of the two tasks. Testing order of visual condition and copying task was randomly rotated among subjects. The medial copying task was to trace a straight line printed on a sheet of graph paper; the lateral task was to trace a line displaced 8 inches to the right but parallel with the medial line. Criterion measures were absolute deviations from the line at five and ten inch marks from the starting point. Analyses revealed: 1) these adult educable mentally retarded subjects were accurate under conditions of vision but deviations from the line were significantly greater under conditions of no vision for both lateral and medial tasks, 2) subjects did not deviate significantly more from the lateral task than they deviated from the medial line, 3) practice under one visual condition had no effect upon performance of the other, 4) subjects were almost twice as variable in their copying performances under conditions of vision than under conditions of nonvision,

5) low reliability was evident from first to second trials on both tasks, and 6) relationships between performances in medial and lateral tasks were low.

385. YOUNG, V. Louise. *Spontaneous Verbalization in Educable Mental Retardates During Five Field Trip Experiences.* Master's thesis. University Park, Pennsylvania: Pennsylvania State University, 1972.

Three students classified as educable mentally retarded were selected from a special education school summer program as 1) most quiet in class, 2) most typical of students, and 3) most talkative in class for observation on five field trips with the entire class and in the classroom. One field trip was taken each week and represented different types of learning environments such as 1) guided and unguided, 2) indoors and outdoors, and 3) confining and unconfining. Trips included visits to a water cave, outdoor education area with nature trail, strip mine, military museum and historical mansion, and dairy and beef farms. One classroom observation was made each week. Observers recorded verbal responses as well as other actions of the three children. It was concluded: 1) field trips positively affected extent of verbal responses, 2) amount of freedom allowed including movement and speech had a positive influence on frequency of verbalization, and 3) quantative differences were observed among field trips according to characteristics of the trip and nature of responses.

386. YURICK, John C. *A Comparison of Small Muscle Reaction Time and Speed of Movement of Individuals with Variable IQ's.* Master's thesis. College Park, Maryland: University of Maryland, 1968.

This study was designed to compare reaction times and speed of movement of normal (N=20; IQ 105 or higher), educable mentally retarded (N=11; IQ 69 to 79), and trainable mentally retarded boys (N=10; IQ 46 to 59). Each subject was measured in speed of reaction, speed of movement, and received a total score; all involved arm movements. Results revealed: 1) no significant differences between normal and educable mentally retarded boys on any tasks, and 2) trainable mentally retarded boys significantly poorer than subjects in the other two groups on all tasks

ADDENDUM

A. Annotations

387. ABLON, Gridth Urwalker. *Comparison of the Characteristics of the Play of Young Mildly Retarded and Average Children, With Mother Present and Absent.* Doctoral dissertation. Cleveland, Ohio: Western Reserve University, 1967.

A group of mildly mentally retarded children (N=18; IQ 58 to 83; MA 19.2 to 32.4 months) was matched with a group of nonretarded children (N=18; IQ 91 to 117; MA 19.4 to 31.8 months). The hypothesis that retarded children would regress more than nonretarded children when separated from their mothers was not supported by data. However, qualitatively, it appeared that nonretarded children were able to use words in a constructive way that helped them to master their anxiety which retarded children were not able to do.

388. ALLEY, Gordon R. "Perceptual-Motor Performances of Mentally Retarded Children After Systematic Visual-Perceptual Training." American Journal of Mental Deficiency 73: 2: 247-250; September 1968.

This study investigated effects of an extended two months, systematic training program of visual-perceptual activities on sensori-motor (Lincoln-Osertsky Motor Development Scale, Purdue Perceptual Motor Survey), visual-perception (Benton Visual Retention Test, Kuhlmann-Fine Test, Frostig Test), and concept formation (Illinois Test of Psycholinguistic Abilities) tasks of educable mentally retarded children (N=48; CA 7-5 to 9-10). The training program consisted of visual-perceptual activities graduated in difficulty and included five areas: 1) eye-motor coordination, 2) figure ground, 3) form constancy, 4) position in space, and 5) spatial relations. The experimental group (N=24 boys 12, girls 12; CA $\bar{X}$ 8-9) met for 30 minutes each school day; the control group (N=24, boys 12, girls 12; CA $\bar{X}$ 8-10) spent the concurrent time in regular special education classroom activities. Both experimental and control groups improved on several of the ten criterion measures when pre and posttest administrations were compared. However, none of the comparisons and analyses of data between groups resulted in significant differences.

389. ALTMAN, Reuben, Larry W. Talkington, and Charles C. Cleland. "Relative Effectiveness of Modeling and Verbal Instructions on Severe Retardates' Gross Motor Performance." Psychological Reports 31: 695-698; 1972.

This study explored the relative efficacy of modeling and verbal instructions employed independently with severely retarded males (N=45; CA 6-4 to 15-10; IQ 10 to 50, $\bar{X}$ 27.5) to determine the extent they were non-imitative. Subjects were divided into three treatment groups: 1) modeling, 2) verbal instructions, and 3) control. All subjects received the experimental treatment in a minimum abstraction room with an adjoining observation room separated by a full-view one-way mirror. Results indicated that differential treatments did not significantly affect behavior of subjects on the dependent variable (number of seconds spent in contact with a chair). Lack of significant group differences supported the previously reported non-imitative status of severely mentally retarded persons. Methodological implications for modeling as a behavior modification technique with this population were discussed.

390. AMERICAN Association for Health, Physical Education, and Recreation. *Annotated Bibliography on Perceptual-Motor Development.* Washington, D.C.: The Association, 1973.

Although this annotated bibliography deals with overall perceptual-motor function, it has both general and specific applicability to individuals interested in programs, activities, and research for mentally retarded persons. Sections include 1) general readings, 2) bibliographies on the works of Ayers, Barsch, Doman-Delacato, Frostig, and Kephart, 3) general and research bibliographies on auditory perception and movement, body image and movement, depth and distance, perception and movement, feedback and regulation of movement behavior, figure-ground perception/field dependence/field independence, reduced and supplementary perceptual cues and movement, and visual and size perception and movement. Additional sections provide information on 1) tests, programs, and material sources, 2) assessment instruments, and 3) films.

391. ANDRES, Catherine. *The Status of Municipal Recreation for the Mentally Retarded.* Master's Project. Minneapolis, Minnesota: University of Minnesota, 1967.

In April 1967, 166 cities throughout the United States were surveyed regarding their municipal recreation programs for mentally retarded persons. These cities consisted of the largest two cities in each of the 50 states as well as other

cities with populations of 100,000 or more. A questionnaire consisting of only five questions was sent to the Director of Recreation and Parks in each of these cities; 121 (73 percent) questionnaires were returned and used in analyses. Information was obtained about 1) staff, 2) consultant assistance, 3) municipal recreation programs and activities, 4) special programs and activities, and 5) municipal playground programs involved in and for mentally retarded persons. Major findings included: 1) 55 percent of returned questionnaires indicated some type of program for mentally retarded persons, 2) 45 percent of responding departments employed a staff member who directed these programs, 3) 8 percent of these departments used a consultant to aid in planning these programs although they did not employ a director on either a paid or volunteer basis, 4) 37 percent offered city-wide or district programs for mentally retarded persons, 5) 28 percent provided special programs in recreation centers, and 6) 25 percent offered special programs for mentally retarded persons on municipal or special playgrounds.

392. ANOOSHIAN, Varujan B. *A Comparison of Two Instructional Techniques for Improving Balance in Profoundly and Severely Mentally Retarded Boys.* Doctoral dissertation. Greeley, Colorado: University of Northern Colorado, 1970.

Purpose of this study was to determine which of two instructional techniques was better for improving balance in severely and profoundly pre-adolescent and adolscent mentally retarded boys (N-50; CA X 13-6; IQ X 26.5) from two wards in a state residential facility. Subjects were divided into three groups: 1) regular physical education instruction, 2) conventional instruction in balance activities, and 3) instruction in roller skating. Prior to the start of the experimental period, all subjects were tested for static (number of counts stood on one foot with a maximun of five points) and dynamic (number of steps taken before falling off a walking beam) performance. The treatment period was ten weeks with each subject receiving 40 minutes of instruction a day, five days a week. Analyses of pre and posttest data indicated: 1) no significant differences in posttest scores for static balance among the three groups, 2) a significant difference between control (physical education) and experimental (balance and roller skating) groups in dynamic balance on the posttest, and 3) significant improvement in balance for experimental groups but not for the control group. The investigator concluded that both methods of balance instruction enabled subjects to improve balance, but no significant difference was found between these two methods of instruction.

393. AUXTER, David. "Motor Skill Development in the Profoundly Retarded." Training School Bulletin 58: May 1971.

This reports a motor development program for non-ambulatory, profoundly retarded persons (N=12; CA 12 to 30; MA 6 to 18 months) in a state residential facility. Subjects were trained on a one-to-one basis in a program designed to 1) increase range of motion, 2) develop extensor strength, 3) improve proprioceptive stimulation, and 4) develop integrative function of joints. It was noted that these subjects had many common problems including tight gastro-soleus muscles, hamstrings, and hip flexors. Increase in range of motion contributed to maintenance of an upright position. Development of extensor strength also concentrated on muscles related to upright locomotion and was sequenced in three stages: 1) control of head, 2) control of trunk, and 3) control over hip extensors, knees, and ankles. Considerable movement was provided so subjects could become familiar with movement capabilities of their bodies through proprioception. A mat and inclined plank were basic equipment for this part of the program; subjects could be moved from side to side, front to back, back to front at different rates of speed. Various positions and movements were done on scooter boards to promote integrated motor function. Behavior modification was used throughout the program as subjects were given an M and M candy with each correct motor response. Although no statistical analyses were reported, the program was felt to yield good results. Gains were made in some aspects of the program in all cases; with increased motor function, subjects seemed to engage voluntarily in a variety of motor activities.

394. BAER, D. M., R. F. Peterson, and J. A. Sherman. "The Development of Imitation by Reinforcing Behavioral Similarity to a Model." Journal of the Experimental Analysis of Behavior 10: 405-416; 1967.

Imitative behavior of three severely mentally retarded subjects was shaped as a model performed various motor tasks preceded by the verbal command, "Do this;" subjects were given social and edible reinforcements upon accurate duplication of modeled behavior. Eventually, by following this procedure, subjects showed previously unobserved and unreinforced imitative responses.

395. BAUM, Mary Anne. *The Relationship Between Participation in a Program of Dance Therapy and Changes in Flexibility of Selected Joints of Educable Mentally Retarded Women.* Master's thesis. Denton, Texas: Texas Woman's University, 1972.

Subjects (N=23; CA 24 to 35) from a state school for mentally retarded persons were exposed to 30 sessions of dance

therapy for a period of six weeks. Units of dance therapy were developed in three sections: 1) warm-up exercises, 2) flexibility exercises, and 3) natural movements. A goniometer was used to measure hip abduction, hip flexion, and plantar flexion before, after, and six weeks following the experimental period. Analyses indicated significant improvement in hip abduction and hip flexion after participation in a program of dance therapy for six weeks.

396. BERKOWITZ, S. *Acquisition and Maintenance of Generalized Imitative Repertoires of Profoundly Retarded Children with Retarded Peers Functioning as Models and Reinforcing Agents.* Doctoral dissertation. College Park, Maryland: University of Maryland, 1968.

Four previously non-imitative profoundly retarded subjects acquired a generalized imitative repertoire of behaviors. Imitative training procedures involved the model's performance of simple motor tasks preceded by the verbal direcctive, "Do this;" subjects were reinforced contingent upon imitation of modeled behavior.

397. BOWERS, Louis. "The Status of Physical Education for the Mentally Retarded." Physical Education and Recreation for Handicapped Children: Proceedings of a Study Conference on Research and Demonstration Needs. ED 034 345. Washington, D. C.: American Association for Health, Physical Education and Recreation and National Recreation and Park Association, n.d.

This summary presentation briefly traced research and program development in physical education for mentally retarded persons from the end of World War I through the latter part of the 1960's. Summaries of research were identified, key studies summarized, leadership organizations discussed, activities described, and need for action delineated. Recognition was given to how far physical education for mentally retarded persons had come; how soon it would reach its destined potential was left to future research and teaching actions.

398. BRACE, D. K. "Motor Fitness of Mentally Retarded Boys Relative to National Age Norms." *Abstract of Research Papers, 1961 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1961.

Purpose of this study was to compare levels of physical fitness of a group of mentally retarded boys (N=65; CA $\bar{X}$ 13.6; IQ $\bar{X}$ 60.3) at a state school with national age scales for boys of the same chronological ages on the AAHPER Youth Fitness Test. Mentally retarded subjects scored on the average substantially below national age norms. Other findings were: 1) percentages of scores of mentally retarded boys falling in normally expected

quartiles were best in sit-ups and poorest in pull-ups, jumping, and running events, 2) a strong tendency for retarded boys to make poorer scores on their second tries than on first attempts, 3) mentally retarded boys were particularly poor in running events and evidently could profit from much more vigorous activity, and 4) coefficients of coorelation were low between IQ and various combinations of test scores.

399. BRUNO, Tony J. *Some Effects of Body Control Development on the Swimming Performance of a Group of Institutionalized Mentally Retarded Boys.* Master's thesis. Madison, Wisconsin: University of Wisconsin, 1966.

Twenty institutionalized mentally retarded boys were divided into two groups which participated in either tumbling or body balance activities during two 20 minute periods per week for six weeks. Participants of the tumbling program scored more favorably on a final swimming test and appeared more assertive and confident of themselves. The author attributed a portion of this development to familiar land exercises that provided a success experience prior to water exercise. Results suggested that treatment should approach motor ability in retarded children as something that can be improved rather than a characteristic which must be accomplished.

400. CAMPBELL, Jack. "Physical Fitness and the M.R.: A Review of Research." Mental Retardation, October 1973. (Vol. 11, No. 5), pp. 26-29.

Many experts disagree as to what constitutes physical fitness, but there is some consensus that it includes both motor and organic components. Many studies indicated that mentally retarded persons functioned at significantly lower levels than intellectually normal individuals on most measures of physical fitness. This was felt to be important because of demonstrated relationships between physical fitness and other important variables such as 1) intelligence, 2) academic achievement, 3) personality development, and 4) social acceptance. The literature clearly documented that physical fitness of mentally retarded persons could be significantly improved as a result of exposure to planned and systematic programs of physical fitness training.

401. CAMPBELL, John W. *Evaluation of A Contingency Managed Physical Fitness Program for Mentally Retarded Boys.* Doctoral dissertation. University Park, Pennsylvania: Pennsylvania State University, 1971.

Purpose of this investigation was to determine whether a contingency managed, token economy physical fitness training

program produced higher levels of physical fitness than a non-token economy program. It also attempted to ascertain whether an adapted Royal Canadian Air Force (RCAF) physical fitness program produced higher levels of physical fitness than a program of physical education and recreation to which institutionalized mentally retarded boys (N=51; CA 10 to 19; IQ 20 to 84) were typically exposed. A sample was selected from the existing institution population and then given the AAHPER Special Fitness Test. Subsequent to administration of this pretest, subjects were matched according to height and weight and randomly assigned to either 1) contingency managed token economy RCAF program (N=20; CA $\bar{X}$ 14-3; IQ $\bar{X}$ 56.8), 2) non-token economy RCAF program (N=16; CA $\bar{X}$ 13-6; IQ $\bar{X}$ 64.0), or 3) control group (N=15; CA X 14-0; IQ X 49.0). The RCAF program consisted of five basic exercises: 1) toe touches, 2) sit-ups, 3) head and shoulder lifts from a prone position, 4) push-ups, and 5) running in place. The existing institution program consisted of a variety of activities including physical education, recreation, arts and crafts, and dance. The contingency managed, token economy condition consisted of awarding points to subjects for increasing number of repititions within a specified time limit; points could be spent at designated times for a variety of back-up reinforcers. The non-token economy condition did not provide subjects with an opportunity to earn points. After eight weeks results showed: (with the Special Fitness Test as the criterion) 1) the RCAF program produced higher levels of physical fitness than the existing institution program, 2) the RCAF program was generally enhanced when combined with a token economy, 3) effects of the contingency managed, token economy were not demonstrated as clearly by the Special Fitness Test as they were when performance scores on the RCAF exercises were used in the dependent variable, 4) results of the Special Fitness Test indicated that the contingency managed, token economy group was superior to the non-token economy group on only one subtest, and 5) weekly tests between groups exposed to the treatment revealed that on four of the five exercises, the contingency managed token economy group scored significantly better than the non-token economy group an average of six times.

402. CARTER, J. E. L. "Physical Fitness of Grade 12 Boys with Different Intelligence Levels." *Abstracts of Research Papers, 1967 AAHPER Convention.* Washington, D.C.: American Association for Health, Physical Education and Recreation, 1967.

Purpose of this study was to compare levels of physical fitness of 1) special, 2) average, and 3) gifted 12th grade boys. The 195 subjects, 65 in each IQ group (Stanford-Binet), were selected from the 2,200 12th grade boys who were tested on the San Diego City Schools revision of the California Physical Per-

formance Test consisting of 1) standing broad-jump, 2) pull-ups, 3) bent-knee sit-ups for 90 seconds, 4) 50-yard dash, and 5) 600-yard run-walk; subjects were not identified until testing of all boys was completed. Results showed: 1) the gifted group was superior to the special group on pull-ups and on 600-yard run, 2) the average group was superior to the special group on 600-yard run, 3) while gifted and average groups compared favorably with the total population means on all tests, the special group was poorer on all tests, and 4) slight superiority of the higher IQ groups supported similar findings from other studies; however, when comparisons on all tests were considered, this superiority was slight. That there were not greater differences was attributed in part to the fact that all individuals in the study participated in the required daily physical education program.

403. CRAMER, Mary Valentine. *The Effect of Musical Stimuli During Motor Activity Upon the Attention to a Task of the Educable Mentally Retarded Child.* Master's thesis. University Park, Pennsylvania: Pennsylvania State University, 1972.

Effects of slow (folk) and fast (popular) musical stimuli and absence of musical stimuli during playground ball handling upon attention to the task of educable mentally retarded boys (N=14) and girls (N=10) were studied. Three groups of eight individuals performed activity on three alternate days of the week for two alternate weeks. The order of stimuli during performance of activity was: Group I-fast, no music, slow; Group 2-slow, fast, no music; Group 3-no music, slow, fast. Activity was performed to one type of stimulus per day. Musical stimuli were projected by a portable record player and all sessions were videotaped. Attention of subjects to the task was measured by the total time in seconds in which the subject attended to the ball. Analyses showed no significant differences among effects of fast (popular), slow (folk), and absence of musical stimuli upon attention to the task of playground ball handling for these educable mentally retarded children.

404. CRUM, Mercedes S. "Development of Motor Skills in Mentally Retarded Children." Hampton, Virginia: Hampton City Public Schools (19 Cary Street), December 1969.

This project was designed to study effects of an intensive physical education program for mentally retarded children (trainable N=44; educable N=96) who participated in 30 to 45 minute daily classes involving motor skill activities, low organized games, and a physical fitness program. Pre and posttests were administered to assess levels of motor development, physical fitness, academic achievement, social adjustment,

and peer rating. Tables provide computations of chronological and mental ages, and test results. Results did not indicate significant differences in any comparisons, but the program was felt to have improved both morale of teachers and self-concept of the children.

405. DOLDE, Elizabeth M. *Guidelines for Therapeutic Recreation Programs for Emotionally Ill and Mentally Retarded Residents Within Commonwealth of Pennsylvania Institutions.* Master's thesis. University Park, Pennsylvania: Pennsylvania State University, 1972.

Elements of therapeutic recreation were defined as the philosophy, goals and objectives, programs, staffing, in-service training, facilities, equipment and supplies, and budgeting of the therapeutic recreation department. Data were obtained from two sources: 1) a review of the literature and 2) an analysis of information gathered by mail questionnaire and interviews from 22 recreation directors within state schools and hospitals in Pennsylvania. Findings delineated several areas where change would be desirable within the overall activities of the therapeutic recreation department in Commonwealth institutions, including budgetary problems, needed staff, equipment, repairs and transportation for patients. On the basis of the guidelines, the Therapeutic Recreation Position and Standards Committee, which operates under the auspices of the Department of Public Welfare, will develop a series of sequential standards within each of the elements that would allow a therapeutic recreation department to evaluate progress within each component area.

406. DUTTON, Gordon. "The Size of Mental Defective Boys." Archives of Disease in Childhood 34: 331-333; August 1959.

This study made comparisons of skeletal development, height, and weight of boys with undifferentiated type of mental deficit with those having organic brain lesions. Subjects (N=119; CA 5 to 18) consisted of four groups of mentally deficient boys from wards of hospitals specializing in the care of mentally deficient persons: 1) organic (N=31), 2) non-pathological (N=16), 3) metabolic those whose heights were depressed more than one year (N=22), and 4) mongoloids (N=50). Groups were subdivided according to 1) normal in height for age and 2) markedly shorter than should be. Two of the four groups failed to show normal growth; one group showed developmental failure also. The metablolic group displayed widespread biological inferiority involving physical, mental, and biochemical immaturity. The non-pathological group appeared to be normal variants at the lower end of the distribution range of intelligence. It was felt that growth and development were under different hormonal control.

407. ELROD, Joe M. *The Effects of Perceptual-Motor Training and Music on Perceptual-Motor Development and Behavior of Educable Mentally Retarded Children.* Doctoral dissertation. Baton Rouge, Louisiana: Louisiana State University, 1972.

Educable mentally retarded children (N=30; CA 9 to 12) participated in this study in which one group of 15 subjects participated in a sequential perceptual-motor program combined with a structured music program; the other group participated in the music program only. The case study technique was employed to describe and evaluate experiences of subjects in respective programs. Data included family and social background, medical, psychological, and education records, results from the Purdue Perceptual-Motor Survey, information from a teacher rating scale, and daily anecdotal records concerning classroom participation, social and emotional behavior, and personal health habits. While the program of perceptual-motor activities combined with music brought about greater gains in perceptual-motor skills than the music program alone, both programs resulted in improvements in social and emotional behavior. Indications were that improved physical skills enhanced self-concept.

408. EVANS, Jane R. *A Comparison of the Synchronous, Rhythmic Motor, and Spontaneous Rhythmic Movement of Educable Mentally Retarded and Normal Children.* Doctoral dissertation. Columbus, Ohio: Ohio State University, 1972.

Analyses of Lincoln-Oseretsky Motor Development Scale items, measuring synchrony and a test of auditory motor rhythm indicated no difference between performances of retarded and normal children of comparable chronological ages. Similar responses in a nondirected situation indicated that spontaneous movement was a function of factors other than intelligence or sex.

409. FALLERS, Jeanne F. *An Investigation of the Motor Ability of Thirty High Grade Mentally Defective Girls with the Oseretsky Tests of Motor Proficiency.* Master's thesis. Jacksonville, Illinois: MacMurray College, 1948.

In this study a qualitative analysis of motor performances (Lincoln-Oseretsky Motor Development Scale) of high grade mentally defective (mildly retarded) girls (N=30; IQ 45 to 69; CA 6-9 to 15-6, $\bar{X}$ 11-9; MA $\bar{X}$ 5-11) was obtained. Analyses included 1) motor age, 2) degree of motor acceleration or retardation, 3) motor classification, and 4) motor profile for each subject. Results indicated: 1) none of the subjects attained a rating of normal on the Lincoln-Oseretsky Motor

Development Scale, 2) 60 percent of the girls were classified as motor idiots, 3) 17 percent were found to have marked motor retardation, 4) 13 percent were reported to have moderate motor retardation, 5) some relationship was noted between motor and mental development since girls in the lower IQ range (45 to 52) accounted for the majority of the motor idiots while those in the upper IQ range (61 to 69) had greatest variability in scores and fewest in the bottom category.

410. FISHER, A. Craig. *The Relationship Between Participation in Selected Sport Activities and Sex Role Orientation of Institutionalized Males.* Doctoral dissertation. Columbus, Ohio: Ohio State University, 1970.

Six institutionalized males (CA 10 to 13) participated in a structured six week program of self-conceived masculine sports. The purpose was to ascertain relationship between sport participation and sex role orientation. Four of six subjects revealed increments toward masculinity as measured by the Terman-Miles Attitude-Interest Analysis Test.

411. FUCHIGAMI, Robert Y. *An Investigation of the Extent of Integration and Some Related Factors Affecting the Social Relationships of Educable Mentally Handicapped Children in Illinois.* Doctoral dissertation. Champaign, Illinois: University of Illinois, 1964.

Data collected by questionnaire and interview of 111 high school educable mentally handicapped boys (CA 16 to 18) revealed: 1) educable mentally handicapped pupils were assigned frequently to non-academic type regular classes such as physical education and music for part of the day, 2) high school educable mentally handicapped boys participated more in neighborhood activities than in school related social activities, and 3) educable mentally handicapped boys with IQ scores above 60 generally participated in more social activities in school and in their neighborhood than boys with IQ scores below 60.

412. GEORGE, Colleen. "Reliability Estimates of Grip Strength Assessments in the Institutionalized Mentally Retarded." American Corrective Therapy Journal 27: 6: 173-175; November/December 1973.

This study was designed to determine reliability coefficients for grip strength (dynamometer) of preferred and non-preferred hands in each of three tonic neck postures for moderately (IQ 50 to 70) and mildly (IQ 70 to 90) institutionalized mentally retarded ambulatory, right-handed residents not participating in any other study concurrently. Subjects were tested in the

supine position, four trials were given for each hand with the head in each of the following three positions: 1) head in anatomical position, 2) head rotated to the right, and 3) head rotated to the left. Analyses revealed: 1) spuriously high rehability coefficients under conditions of the measurement schedule and for this population, 2) intraclass correlation coefficient seemed to give the most realistic reliability assessment, and 3) best trial rather than mean of four trials was suggested as best criterion measure under conditions of the study.

413. HARDT, Lois J. *An Investigation of Effecting Behavioral Changes Through Recreation: An Investigation of Conceptual and Behavioral Changes in Parents and Retardates Through Adapted Recreation Activities.* Doctoral dissertation. New York, New York: New York University, 1964.

A modified version of the Vineland Social Maturity Scale was used to measure behavior of mentally retarded youngsters (N=29; CA 16 to 32); a Q sort was devised to measure concepts of parents. Analyses of results revealed no significant differences between behavior of the subjects and concepts of their parents.

414. HEATH, S. Roy. "Clinical Significance of Motor Deficit with Military Implications." American Journal of Psychology 57: 482-499; July 1944.

This study was designed to investigate the significance of disturbances--i.e., inability of awkward men to keep in step, to toss hand grenades, and to catch ammunition--often found in mentally defective men in the army. Detailed explanation and exploration of a rail-walking test was presented as a means of identifying and differentiating endogeneous and exogeneous mentally retarded men since rail-walking scores correlated highly with fluid or general ability but not with crystalized or abstract ability. Predictions were made that low fluid ability and low rail-walking scores indicated organic deviation which low fluid ability and high rail-walking scores suggested functional interferences. Rail-walking was felt to be a valid and reliable index of locomotor coordination and a quantitative measure of general motor control.

415. HEATH, S. Roy. "The Relation of Rail-Walking and Other Motor Performances of Mental Defectives to Mental Age and Etiologic

Type." Training School Bulletin 50: 6: 119-127; October 1953.

A primary purpose of this study was to determine relationships of rail-walking test scores to results of other selected motor tasks. Each subject (N=132; familial N=80, MA $\bar{X}$ 8-1, CA $\bar{X}$ 17-11; nonfamilial N=52, MA $\bar{X}$ 8-1, CA 21-6) was given eight tests in a standard order: 1) rail-walking, 2) peg board, 3) standing high jump, 4) rings on rod, 5) punch board, 6) rate of manipulation, 7) finger tapping, and 8) turnbuckle. Results showed: 1) familial surpassed nonfamilial subjects on performances in seven of eight tests, 2) relationships between motor test scores and mental ages were not uniform at each mental age level studied, 3) positive but only moderate correlations between motor performances and IQ in both etiologic groups, 4) rail-walking scores and mental ages were highly correlated in familial group but only slightly so in nonfamilial group (the high jump was only other test to approach such a relationship with mental age).

416. HEBER, Richard Franz. *Expectancy and Expectancy Changes in Normal and Mentally Retarded Boys.* Doctoral dissertation. Nashville, Tennessee: George Peabody College, 1957.

Sixty mentally retarded boys were matched with boys of average and above average intelligence on performance efficiency for a reaction time task; half were told they had been successful and half that they had failed. The first part of the study was concerned with generalized expectancies for success and failure in mentally retarded and normal boys. It was found that a series of success experiences resulted in greater increments in performances in retarded than in normal subjects. Contrary to predictions, both retarded and normal subjects showed an increase, rather than a decrease, in performances under the failure condition. the second part of the study was concerned with the efffct of goal value on expectancy. The finding supported the hypothesis that expectancy, as measured by performance efficiency, was not influenced by goal value.

417. HIERS, MARGARET HANES. *A Comparison of the Readiness Test Performance of a Group of Primary-Level Educable Mentally Retarded Children Instructed on Visual-Motor Perceptual Tasks and a Comparable Group Receiving no Prescribed Instruction.* Athens, Georgia: University of Georgia, 1970.

Purpose of this study was to compare readiness test performance of a group of primary level educable mentally retarded children (CA 6 to 10) instructed on prescribed visual-motor perceptual tasks with performance of a comparable

group receiving no prescribed instruction. Experimental and control groups each consisting of 25 subjects (5 at each age level), were equated on IQ, chronological age, race, and sex. Subjects in the experimental group received 60 daily 30-minute sessions of prescribed visual-motor perceptual training; subjects in the control group were given no prescribed instruction on visual-motor perceptual tasks. All subjects were given the Metropolitan Readiness Test, Form A, prior to initial instruction and the Metropolitan Readiness Test, Form B, following the 60-day instructional period. Analyses indicated: 1) total readiness test performances of primary-level educable mentally retarded children were positively affected by the prescribed instruction on visual-motor perceptual tasks, 2) total readiness performances were related to age and were differentially affected by age and time, 3) performances of primary-level educable mentally retarded children on the Metropolitan Readiness subtests for listening and alphabet were positively affected by prescribed visual-motor perceptual training, 4) performances of educable retarded children on subtests for word meaning, matching, numbers, and copying were not sifnificantly affected by prescribed instruction, 5) age groups differed significantly on all subtests except listening, and 6) performances were differentially affected by age and time for the subtests alphabet and copying.

418. HILSENDAGER, Donald R., Harold K. Jack and Lester Mann. "The Buttonwood Farms Project: A Physical Education - Recreation Program for Emotionally Disturbed and Mentally Retarded Children." Journal of Health, Physical Education, Recreation March 1968.

This article describes results and application of findings from the physical activity program of the Buttonwood Farms Project of Temple University. Included are sections that 1) deal with the ingredients of activity essential to a child with emotional problems or classified as mentally retarded, 2) describe the organization of physical conditioning activities, 3) outline the fundamental movement program, 4) delineate sports skill commonalities, 5) present physical recreation activities, and 6) discuss implementation of the overall program. Considerable detail is presented about a circuit course to improve levels of physical fitness in these populations. Discussions include 1) rationale, 2) administration, 3) operation, 4) motivation, 5) equipment, and 6) sample circuit courses and activities.

419. KNUDSEN, Jean Ringnalda. *A Socially-Oriented Curriculum for Trainable Retarded Adolescents.* Master's thesis. San Diego, California: San Diego State College, 1962.

The curriculum set-up by the investigator and used experimentally with trainable mentally retarded children was evaluated by both parents of the children and school personnel. They found the curriculum helpful not only in promoting socialization of the group but in developing physical coordination, speech, and academic learning.

420. LAMM, Jesse M. *A Manual for the Administration of Recreation Programs for Mentally Defective Children in State Institutions for Mental Defectives.* Doctoral dissertation. New York, New York: New York University, 1959.

Questionnairies were sent to 97 state institutions for mentally defective persons about administration of their recreation programs. From results a manual was devised which 1) established need, 2) determined principles, and 3) suggested administrative and activity elements for a recreation program in state institutions for mentally defective persons.

421. LANPHEAR, Margaret L. *Fractionated Reaction and Reflex Times on Nine to Twelve Year Old Mentally Retarded Boys.* Master's thesis. Amherst, Massachusetts: University of Massachusetts, 1972.

Visual reaction time and patellar reflex times were fractionated on a sample of six mentally retarded boys (CA 9 to 12). Electromyographic fractionation technique allowed assessment of premotor time component of the voluntary leg kick and reflex latency of the knee-jerk as well as the motor time component or actual muscle contraction time of both tasks. Data collected from each subject over at least a three day testing period were analyzed. It was found that motor time of reaction time testing was significantly different from motor time of the reflex. It was also found that the premotor time and motor time components accounted for approximately the same percentage of total reaction time delay that studies done on normal subjects had reported although reaction times of these retarded boys were much longer than what has been reported for an intellectually normal population.

422. LAPRIOLA, Eileen M. *The Joseph P. Kennedy Jr. Foundation and Its Role in Physical Education and Recreation for the*

Mentally Retarded. Master's thesis. College Park, Maryland: University of Maryland, 1972.

This study presents detailed information about projects and activities of The Joseph P. Kennedy Jr. Foundation in its attempts to encourage use of physical education and recreation programs and activities as media through which mentally retarded persons could achieve their potential in mental and physical growth. Flexibility was demonstrated by the Foundation in seeking direction for program involvement so that the largest possible number of retarded persons could be reached. Such flexibility was enhanced through sponsored research and through adequately trained personnel. A shift of interest and emphasis from the community recreation setting to the school physical education program was evident in activities during the most recent years. Specific sections deal with 1) demonstration projects, 2) recreation programs in Washington, D.C., 3) leadership recreation, conferences and workshops, 4) research activities, 5) affiliations with other agencies and organizations, 6) training and leadership development activities, 7) international awards, 8) special fitness awards program, 9) involvement with federal government, 10) involvement with foreign programs, and 11) Special Olympics.

423. LAWHORNE, T. Wayne. "Physical Fitness for the Mentally Retarded: A Reality." Training School Bulletin 62: 2: 45-48; August 1966.

This study was designed 1) to show need for physical fitness programs for mentally retarded persons and 2) to demonstrate that they could improve their levels of physical fitness. Residents (N=40 males 40; CA 17 to 35) of a state home and training school were given the AAHPER Youth Fitness Test. These results showed need for starting a fitness program. Five basic exercises--pull-ups, push-ups, sit-ups, spring-ups, back bridge--were selected as core program; subjects were also tested each week. To motivate performance, three fitness levels were established with specified requirements for each exercise; participants had to meet requirements for all five test items at one level before being tested on any exercise at the next level. Subjects practiced fitness test activities as part of their daily exercise program; weekly tests were used to determine when subjects were ready to move to the next level. As participants met requirements for each level, they received badges to wear on their regular clothes; subjects worked hard to achieve each level. When they reached the third level, they had to maintain this level by continuing to perform exercises according to third level standards; those who failed to do so, reverted to level two

until such time as they could again pass level three standards in all exercises. At the end of six months 58 percent of the subjects achieved level one, 20 percent level two, and five percent level three.

424. LINFORD, Anthony G. and James Hunter Duthie. *The use of Operant Technology to Induce Sustained Exertion in Young, Trainable Down's Syndrome Children.* Champaign, Illinois: University of Illinois (Institute for Research on Exceptional Children), 1970.

The behavior modification technqiue of chaining was used to teach two young trainable mongoloid children a three task endurance, strength, and motor skill circuit. Subjects were first taught to transfer blocks in a shuttle run involving a total distance of 160 yards with food or candy as reinforcers. The second task required subjects to climb an inclined ladder, go through and down, then complete the shuttle run. The final item involved lifting and dropping a ten pound ball, then climbing the ladder and finally running the shuttle. When primary reinforcement was withdrawn, the male subject showed a decrement in performance; the next day, social reinforcement was withdrawn and extinction was complete. On successive days, primary and social reinforcement were withdrawn from the female subject, but no performance decrease was shown even after two more days. The examiner was then removed from room, and extinction occurred after two days; behavior was brought under stimulus control again by reintroducing reinforcement. The study showed that sustained high level exertion could be brought about in trainable children. Charts provide data on time required for shuttle runs, time required for circuit, and post-exercise heart rates.

425. LLEWELLYN, Jack H. *Effects of Two Levels of Overlearning on Retention of a Gross Motor Skill by Institutionalized Educable Mental Retardates and Normal Students.* Doctoral dissertation. Tallahassee, Florida: Florida State University, 1972.

Educable mentally retarded children (N=61; CA 12-0 to 15-0, $\bar{X}$ 14-2; IQ 48 to 78) were matched with two groups of normal children--chronological age comparisons (NCA N=79; CA 12-2 to 15-11, $\bar{X}$ 13-11) and mental age comparisons (NMA N=71; CA 6-1 to 12-2, $\bar{X}$ 9-6) and compared on their abilities to perform a gross motor skill (stabilometer). The criterion score was 22 seconds on-balance in a 30-second trial; retention was measured by absolute recall and savings scores, with scores being recorded as seconds on-balance to .01 seconds and as number of trials required to reach the criterion. Each main group was divided into three subgroups, each of which received either zero, 50, or 100 percent overlearning. Retention scores were

administered two minutes one week, or one month (depending on group placement), and three months after original learning. Results indicated: 1) 100 percent overlearning was better than either zero or 50 percent overlearning two minutes after learning, but overlearning after this time was of no benefit to retention, 2) EMR group was superior to both NCA and NMA groups in savings score after three months, 3) EMR was also superior to NMA group in savings score after one month, and 4) in overall performance both EMR and NCA groups performed at similar levels and both groups performed better than the NMA group.

426. LOYND, Jenni and A. Barclay. "A Case Study in Developing Ambulation in a Profoundly Retarded Child." Behavior Research and Therapy 8: 207; 1970.

This paper describes management of an ambulation deficit apparently resulting from an aberrant reinforcement history. The subject was an eight year old, microcephatic, profoundly mentally retarded girl (MA 1; social quotient on Vineland Social Maturity Scale 17). She achieved independent walking behavior after approximately 84 behavior shaping sessions; various social and psychological concomitants of this behavior were also discussed. Other motor skills were being developed through this same process at the time this paper was written. In addition stimulating greater acceptance of the girl by her family, training sessions also were advantage in teaching the parents appropriate use of reinforcement to attain desired behavioral outcomes.

427. MAGEE, Maureen R. *An Experiment With Bowling Skills and the Mentally Retarded.* Vernon, Connecticut: Division of Special Education, n.d.

This study was designed to determine ability of mentally retarded children (N=9, males 2, females 7; CA 7 to 9; MA 3 to 7) 1) to perform selected bowling skills and 2) to demonstrate effects of training and practice on these same bowling skills. Ten plastic animal figures eight inches in height were used as pins; each subject had his own bowling ball made of crushed newspaper and wrapped with masking tape; all activities were done in a regular classroom setting. Each child demonstrated his ability to roll a rubber ball at a large stuffed animal. Without further practice and without training, subjects rolled a newspaper ball at the ten pins; this was done at a distance from which each child was able to hit pins and it was considered trial one. Special bowling exercises and activities were then performed for nine consecutive school days, trails two through six took place

during this same nine day period. Criterion for success was six pins or more knocked down on a single roll. Eight of nine subjects improved by increasing distance (7'4" on trial one to 14' on trial four; $\bar{X}$ improvement 6'8") at which they were able to knock down six or more pins. In addition, all children enjoyed bowling although on the seventh day several did appear to lose interest in the exercises; however, there was no relationship between intelligence level and loss of interest in these activities. Results indicated that these subjects were able to attain a significant degree of motor educability as reflected in their bowling skills.

428. MALPASS, Leslie F. "Motor Proficiency In Institutionalized and Non-Institutionalized Retarded Children and Normal Children." American Journal of Mental Deficiency 64: 1012-1015; 1960.

This study was conducted to ascertain whether comparable groups of institutionalized (N=52; CA $\bar{X}$ 11-11; IQ $\bar{X}$ 62.8) and non-institutionalized (N=56; CA $\bar{X}$ 11-8; IQ $\bar{X}$ 67.8) mentally retarded boys and girls could be differentiated on the basis of motor proficiency (Lincoln-Oseretsky Motor Development Scale) and whether motor ability of mentally retarded children could be distinguished from that of normal children (N=71; CA $\bar{X}$ 11-8). Groups matched on the basis of chronological age were selected from a state school for mentally defective persons, public school classes for educable mentally handicapped children, and public school classes for children of normal intelligence. Results showed: 1) the Lincoln-Oseretsky Motor Development Scale did not differentiate groups of institutional and public school special class educable mentally retarded children while there were highly significant differences when scores were compared with those of normal children, 2) no differences in motor proficiency between mentally retarded boys and girls, and 3) relationships between motor proficiency and intelligence could be predicted for mentally retarded but not normal children.

429. McCLANAHAN, Lloyd James. *The Effectiveness of Perceptual Training for Slow Learners.* Palto Alto, California: Stanford University, 1967.

This study was designed to measure effects of 35 hours of visual perceptual training on mental maturity, perceptual skills and readking performances of slow-learning first grade children (N=92) and of children enrolled in classes for educable mentally retarded (N=23). In addition, the study proposed to assess differential effects of dominance (Harris

Test of Lateral Dominance) and body image (Draw-a-Man Test) on perceptual learning of these subjects. Prior to randomization, a sample pool of 113 first grade children who had scored below the median on the Lee-Clark Reading Readiness Test were identified. The children were also tested and classified as either: 1) mixed, crossed, or unilateral dominant, and 2) as having adequate or inadequate body image. From this pool, 92 children were assigned to four experimental and two control classes. Educable mentally retarded children from the same school district were assigned at random to either an experimental or control condition. All subjects took the California Test of Mental Maturity-Short Form (CTMM), and the Frostig Developmental Test of Visual Perception (DTVP). The assumption was made that reading ability of first grade children at the beginning of the school year would be negligible and differences would be randomly distributed between experimental and control groups. Consequently, the California Achievement Test-Reading (CAT-R) was used as a pretest for mentally retarded subjects only. Following the pretest period, experimental subjects were given 35 lessons devoted to training in perceptual skills. Lessons lasted approximately 50 minutes each and were developed primarily from materials and work of Frostig, Kephart, Getman, and Simpson; control subjects experienced the normal school curriculum.

Analysis of pretest data yielded no significant differences between experimental and control groups for either first grade or mentally retarded subjects. On posttests, first grade experimental groups achieved significantly higher on DTVP and CAT-R, but not CTMM, when compared to control groups. Although experimental mentally retarded subjects attained higher mean scores on all posttests, none were significant. Other analyses revealed: 1) in five out of six comparisons test results favored children who were classified as unilateral dominant or as having adequate body image, and 2) differences in posttest CTMM mean scores between subjects exhibiting adequate body image and those said to have inadequate body image were significant.

430. MILLER, James F. and Robert K. Throop. *Investigation of the Effects of an Aquatics Program on the Psycho-Motor Function Of Trainable Mentally Retarded Children.* Syracuse, New York: Educational and Cultural Center Serving Onodaga and Oswego Counties, November 1970.

This project was designed to determine effects of an aquatics program on psycho-motor functions and body image of trainable mentally handicapped children (N=60; CA 16 and under). Thirty-

nine children were given swimming instructions three days per week over a period of one year. Results did not support the hypothesis that subjects in instructional aquatic classes would show significant psychomotor improvement as compared to those not participating. Researchers indicated that appropriateness of testing tools were questionable. Responses from teachers and parents led researchers to feel that while there were no significant gains in perceptual motor abilities, ego involvement provided by the program appeared to result in improved personal relationships among peers, teachers, and parents.

431. OKADA, Doris Mamiya. *The Effects of Perceptual and Perceptual-Motor Training on the Visual Perception, Auditory Perception, and Language Performance of Institutionalized Educable Mental Retardates.* Doctoral dissertation. New York, New York: New York University, 1969.

This study proposed to examine effects of perceptual and perceptual-motor training on visual perception, auditory perception, and language performance of institutionalized educable mentally retarded subjects (N=120; CA 8-6 to 16-11; IQ 50 to 75). Subjects were assigned to: Experimental I (perceptually-trained group), Experimental II (perceptual-motorially-trained group), Control I (with interaction), and Control II (without interaction). Perceptual training involved both auditory and visual modalities; perceptual-motor training involved addition of gross motor training to auditory and visual training. Subjects were pre and posttested on Marianne Frostig Developmental Test of Visual Perception, Wepman Auditory Discrimination Test, and Illinois Test of Psycholinguistic Abilities. After being pretested, Experimental I and Experimental II were given 48 sessions of training while Control I participated in 48 play sessions during the 16 week training period. Experimenal I and Experimental II were given 15 minutes of visual perceptual training and 15 minutes of auditory perceptual training three times a week. In addition, Experimental II received 15 minutes of gross motor training while Experimental I participated in 15 minutes of play. Control I participated in 45 minutes of play three times a week.

Analyses of raw scores revealed: 1) adjusted posttest means for Experimental I and Experimental II exceeded those for Control I and Control II on all three measures, 2) Experimental II did not show greater gains than Experimental I on any of the measures, except on motor encoding subtest of the Illinois Test of Psycholinguistic Abilities, 3) Control I did not show greater gains in language performance than Control II, 4) follow-

ing training, younger experimental subjects did not show greater gains than older experimental subjects on any of the measures.

Conclusions drawn from this study were: 1) simultaneous training of visual and auditory modalities was effective in raising language performance as well as perceptual performance of institutionalized educable mentally retarded boys and girls regardless of their individual strengths and weaknesses, 2) mentally retarded children might need more intensive motor training than was given in this study for optimum results, and 3) although younger experimental subjects came up to performance levels of older experimental subjects following training, it appeared that younger subjects needed prolonged training if they were to exceed performances of older subjects.

432. ROSER, Judith Anne. *The Relationship of Motor Abilities and Peer Acceptance of Mentally Retarded Children.* Master's thesis. Minneapolis, Minnesota: University of Minnesota, August 1959. (See also "The Relationship of Motor Abilities and Peer Acceptance of Mentally Retarded Children." by J. R. Smith and J. G. Hurst in American Journal of Mental Deficiency 66: 1: 81-85; July 1961.)

Purpose of this study was to investigate relationships of motor skill (Lincoln Adaptation of Oseretsky Motor Development Scale) and social status as indicated by peer acceptance (number of initiated or received, verbal or nonverbal peer contacts) of mentally retarded day school students (N=43; TMR N=18, CA 8-1 to 14-1, $\bar{X}$ 11-6, IQ 33 to 51; EMR N=25, CA 6-6 to 12-0, $\bar{X}$ 9-11, IQ 51 to 77). Subjects were observed during an unstructured play period to determine contacts with both adults and other children; 22 observations were recorded on each child in terms of 1) total, 2) verbal, 3) nonverbal, 4) initiated, and 5) received contacts. Correlations between motor skills and social status were found to be higher in educable than trainable mentally retarded children. Other findings included: 1) brain damage did not affect performances on the Oseretsky Scale, 2) mental ages and performances on the Oseretsky Scale were significantly related (r=.58), 3) verbal and received contacts were significantly related to motor abilities of both educable and trainable mentally retarded children, and 4) overall, motor ability played a significant role in determining peer acceptance of mentally retarded children.

433. SEAMAN, Janet A. *The Effects of a Bowling Program Upon Bowling Skill Number Concepts and Self-Esteem of Mentally Retarded Children.* Doctoral dissertation. Bloomington, Indiana: Indiana University, 1972.

This study was concerned with effects of a six week bowling program upon: 1) bowling skills, 2) number concepts and 3) self-esteem of mentally retarded children. Two groups (N=22) of moderately mentally retarded children (CA 8-0 to 17-9) were matched on chronological age and scores on a number skills test. Repeated measures were collected on bowling skills, number skills, ability to count bowling pins, and self-esteem. Both groups received treatment with the bowling instruction package but only the experimental group received treatment with the teaching aid. Repeated measures were anlayzed to determine changes within each group; posttest scores were analyzed to determine differences in treatment effects. Results indicated: 1) the experimental group improved in ability to count bowling pins standing and deduce pins knocked down, 2) both groups improved in basic number skills, 3) neither group improved significantly in bowling skills, 4) number-control group decreased in self-esteem, and 5) positive relationship were found between all variables.

434. SLEET, David A. *Interdisciplinary Research Index on Play: A Guide to the Literature.* Ann Arbor, Michigan: University Microfilms (300 N. Zeeb Road), 1971. (Document #V-71-0009, $6.00 prepaid.)

This Index contains relevant references about play based on articles and books from medicine, psychology, sociology, anthropology, psychiatry, education, physical education, recreation, health, child development, rehabilitation, philosophy, religion, and ancillary fields. Compilation of titles took about one and one-half years and was completed in August 1970. Specific sections deal with 1) Psychology: Human and Animal, 2) Psychiatry, Psycholotherapy, and Psychonalysis, 3) Sociology and Cultural Anthropology, 4) Philosophy and Religion, 5) Child Behavior and Development, 6) Learning and Education, and 7) Physical Education, Recreation, and Sport. Contents have both general and direct applicability for persons interested and involved in various aspects of physical education, recreation, and related areas for mentally retarded persons.

435. SLOAN, William. "The Lincoln-Oseretsky Development Scale." Genetic Psychology Monographs 51: 183-252; 1955.

This study was designed to select items from the original Oseretsky Test of Motor Development which 1) could be administered to subjects of both sexes from six to 14 years of age, 2) permitted reliable scoring, 3) minimized cultural bias, 4) involved little chance of injury to the subject, 5) did not require elaborate test materials, and 6) had a positive correlation with chronological age. Subjects included 380 males and 369 females with 39 to 46 in each age group. From the original 85 items, 36 were selected for the Lincoln adaptation; 17 of the items involve left and right scoring, so there are actually 53 items on this revised scale. Norms and percentile scores for each sex at each grade level are also presented. Discussion of reliability, validity, administration, scoring, materials, equipment, number of trials, directions, scoring criterion, administrative pointers, and the items themselves are contained in this source.

436. SMITH, Peggy B. "Acquisition of Motor Performance of the Young TMR." Mental Retardation, October 1972. pp. 46-49.

Effects of various reinforcement conditions on acquisition of motor performance by noninstitutionalized pre-academic mentally retarded children (N=60; CA 3 to 10; IQ 25 to 51) were examined. Operant conditioning technqiues included: 1) continuous reinforcement--tangible rewards, 2) continuous reinforcement--verbal rewards, 3) intermittent fixed ratio schedule--tangible rewards, and 4) intermittent fixed ratio verbal rewards. Motor performance was evaluated with a simple task (putting eight inch colored clothespins into a milk bottle). Appropriate treatment reinforcement and schedule were used in conjunction with the motor task. Results indicated that these young preacademic trainable retarded subjects responded to other schedules and types of rewards besides tangible continuous reinforcement. Specifically: 1) subjects who received tangible rewards scored significantly lower than those under verbal reward conditions, 2) motor performances did not differ significantly as a result of reinforcement schedule, and 3) performances did differ significantly as a function of stages of training.

437. TAYLOR, Lucile Nitsche. *Developmental Dance in the Education of the Educable Mentally Handicapped Child.* Master's thesis. Champaign, Illinois: University of Illinois, 1964.

This study searched for values in three months of dance training in the education of elementary school educable

mentally handicapped children (N=10). Dance activity was developed and its effects upon general school behavior and visual and linguistic abilities of the children assessed. Evaluations were based on administrations of Illinois Test of Psycholinguistic Abilities, Frostig Test of Visual Perception, and Purdue Perceptual Motor Survey. Changes in motor development and school behavior of the children were studied by means of a rating scale, and records completed by two observers, the experimenter, and classroom teachers of the subjects. Results showed sensory-motor improvements related to advances in language abilities and visual perceptions as measured by the tests. No claims were made that motor gains were direct causes of the more intellectual gains, but wherever motor gains were greatest and where there was the most marked improvement in dance participation, there also were the largest number of significant intellectual ability improvements.

438. TOMINAGA, Henry K. *Development of Physical Education Guidelines and Activities for Educable Mentally Retarded Classes.* Doctoral dissertation. Greeley, Colorado: Colorado State College (University of Northern Colorado), 1964 .

Purpose of this study was to develop and propose guidelines and suggest activities for a physical education curriculum for use by teachers of educable mentally retarded pupils at the elementary school level. A ten member jury composed of national leaders in health, physical education, and recreation of educable mentally retarded children and a ten member jury composed of leaders in mental retardation from Colorado were selected to participate in verification and establishment of standards. A tentative list of 16 standards was developed and submitted to the two juries. In determining current instructional practices in physical education of educable mentally retarded pupils at the elementary school level, 170 teachers were selected. Each participating teacher rated a questionnaire in light of current physical education practices. An evaluation was made of current instructional practices in physical education against verified and established standards to determine extent to which current instructional practices met the dictates of established standards. Final procedure was to develop and recommend physical education guidelines in light of the verified and established standards. Major findings included: 1) the 16 established standards were accepted as basic guidelines for physical education programs for educable mentally retarded pupils at the elementary school level, 2) according to participating teachers most of the current instructional practices were being adequately emphasized in physical edu-

cation programs for educable mentally retarded pupils at the elementary school level in Colorado, 3) according to participating teachers most of the categories of activities were not being adequately emphasized in physical education programs for educable mentally retarded pupils at the elementary school level in Colorado, and 4) Greater emphasis needed to be given to providing specific physical education activities to agree more closely with the extent of emphasis being placed on current instructional practices which according to participating teachers were being adequately emphasized in Colorado.

439. LONDEREE, Ben R. and Leon E. Johnson. "Motor Fitness of tmr vs emr and Normal Children." Medicine and Science in Sports 6:4: 247-252; 1974.

Motor fitness data on 606 male and 499 female trainable mentally retarded (TMR) children aged 6-19 in State Schools for Retarded Children in Missouri were compared to published norms for educable mentally retarded (EMR) and normal children for height, weight, flexed arm hang, 300 yard run-walk, 50 yard dash, situps in 30 seconds, softball throw for distance, and standing broad jump. The TMR's exhibited considerable impairment on all motor variables. The degree of impairment suggested a curvilinear relationship between intelligence and skill proficiency. The interquartile ranges of the various skills were considerably wider for the TMR's than for EMR's or normals. There were age related increased in ability but plateaus or even decrements in performances occurred in older groups. The typical male-female similarities and differences on motor proficiency appeared to be exhibited by the TMR children. Possible explanations for the reduced motor ability of the TMR children included intellectual complexity of motor acts, generalized genetic and/or environmental impairment, and lack of curricular attention to basic physical fitness needs of TMR's.

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